AC/DC PORTABLE CASSETTE RECORDER 4 BAND RADIO

MODEL CRS-2024

SERVICE DATA

DEC./1978

SUPERSCOPE

SUPERSCOPE®
BY marantz®

SUPERSCOPE INC.
20525 NORDHOFF STREET CHATSWORTH,
CALIFORNIA 91311·U S.A

SUPERSCOPE DESIGN AND SERVICE

Using superior design and selected high grade components, SUPERSCOPE has created the ultimate in stereo sound. Only original SUPERSCOPE parts can insure that your SUPERSCOPE product will continue to perform to the specifications for which it is famous.

Parts for your SUPERCOPE stereo are generally available within 72 hours throughout the nation via a toll-free line to our National Parts Depot in California. The sales professionals who take your call immediately refer to their own desk top computer terminal and can quickly determine the availability and price information you require. If for some reason, your order should exceed our available stock, we usually can instantly provide an alternate replacement part or current delivery information. When the order is placed and confirmed, the computer simultaneously generates "hard copy" orders at the distribution center. As hard copies come directly from the computer to the national parts depot, your requested stock is assembled and prepared for shipment and placed on the first available carrier for delivery to you.

ORDERING PARTS

Phone orders will eliminate mail delays, and we encourage the use of this method. If you order by mail, use SUPERSCOPE parts order forms which are available from our National Parts Depot located at the following address:

SUPERSCOPE NATIONAL PARTS DEPARTMENT
20525 Nordhoff Street
Chatsworth, California 91311
Phone: 1-800-423-5108
1-213-998-9333

The following information must be supplied to eliminate delays in processing your order:

1. Complete address.
2. Complete part numbers.
3. Complete description of parts.
4. Model number for which part is required (indicate SUPERSCOPE).
5. Account number (for account customers only).

Direct consumers will be provided with the current retail prive quotation on available parts in order to advise them of the cost of the parts and shipping.

OVERSEAS PARTS ORDERING

Parts may also be ordered from the following overseas addresses:

CANADA

Superscope Canada, Ltd.
3710 Nashua Drive
Mississauga
Ontario, Canada L4V1M5

AUSTRALIA

Superscope (Australasia) Pty., Ltd.
32 Cross Street (P.O. Box 604)
Brookvale 2100 N.S.W.
Australia

JAPAN

Marantz Japan, Inc.
3622 Kamitsuruma
Sagamihara Shi
Kanagawa, Japan

EUROPE

Superscope Europe, S.A.
Avenue Leopold III, 2
7120 Peronnes-Lez-Binche
Belgium

Marantz France
Rue Louis Armand 9
92600 Asnieres
Hauts-de-Seine
France

Marantz Audio U.K. Ltd.
London Road, 203
Staines
Middlesex
England

Superscope GmbH
Max-Planck-Strasse 22
D-6072 Dreieich 1
West Germany

All of the above locations are fully equipped to take care of your total service needs. Because various countries have differing configuration requirements, it is necessary that you contact the service facility in your particular country. In the event that there is no service location listed for your country, please contact the nearest facility for the necessary assistance.

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SPECIFICATIONS

GENERAL

DIMENSIONS (WxHxD)	20.3 x 38.4 x 11.2 cm (7-61/64 x 14-61/64 x 4-13/32 inches)
WEIGHT	3.5 kg (7.7 lbs)
POWER REQUIREMENT	AC 110V/220V 50Hz Four "D" Size Batteries

NUMBER OF SEMICONDUCTORS:

Field Effect Transistors	2
Transistors	6
Diodes	14
IC	6

TERMINALS:

Microphone x 2	Plug Type: Mini Input Sensitivity: 0.3 mV (−70 dB) Impedance: 9 kΩ
External Speaker x 2	Plug Type: Mini Output Power: 1 W x 2 (2.5 Ω) DC
Stereo Headphone x 1	Plug Type: Phone Impedance: 8 Ω
AC Inlet x 1	

TAPE RECORDER SECTION:

TAPE	Philips Type Cassette Tape
RECORDING SYSTEM	4-Track Stereo AC Bias
ERASING SYSTEM	DC Erase
REW/FF TIME	110 Seconds (C-60)
OUTPUT POWER	1 W x 2 (DC) (2.5 Ω)
FREQUENCY RESPONSE	125 Hz to 8kHz (−5dB)
SIGNAL-TO-NOISE RATIO	42 dB
TAPE SPEED	1-7/8 ips (4.8 cm/sec)±3%
WOW AND FLUTTER	0.28% rms (DIN WTD)

TUNER SECTION:

CIRCUIT SYSTEM	4-Band FM Stereo MW/LW/SW Superheterodyne
FREQUENCY RANGE	FM: 88 to 108MHz MW: 525 to 1605kHz LW: 150 to 370kHz SW: 6 to 18MHz
INTERMEDIATE FREQUENCY	FM: 10.7MHz AM: 455kHz
ANTENNA	FM/SW: Telescopic Rod MW/LW: Ferrite rod
SENSITIVITY	FM: 8 μV (30 dB S/N) MW: 600 μV/m (20 dB S/N) LW: 900 μV/m (20 dB S/N) SW: 100 μV/m (20 dB S/N)
SIGNAL-TO-NOISE RATIO	FM: 45 dB (Input 1mV) MW: 40 dB (Input 5 mV/m) LW: 34 dB (Input 5 mV/m) SW: 37 dB (Input 500 μV/m)
FM STEREO SEPARATION	25 dB (Input 1mV)

1. FEATURES

(1) TOTAL SHUT-OFF

This model uses the total shut-off type tape mechanism. This is such that when the tape has run to the end in any mode (Recording, Playback, Rewind and Fast Forward), then the auto-stop mechanism operates automatically to release the button.

(2) 2-WAY POWER SUPPLY

The CRS-2024 is operable with two types of power supply; "D" size batteries (four pieces) and AC power line. To prevent simultaneous connection of AC source with Built-in batteries, the AC jack (J001) contacts select a single desired power supply. The power supply selection is in the priority order;

(1) AC power line

(2) Built-in batteries

(3) ONE-TOUCH RECORDING SYSTEM

Recording can be made by pressing the REC button only.

(4) FULL-LINE IC

- **Low-voltage, PLL multiplex FM stereo IC**

The present PLL (phase-locked loop) multiplex IC can be run by power voltage as low as 6 V for the first time, while previous ICs require good channel separation for stable, wide sound field. Alignment can be accomplished very easily by adjusting two semifixed controls only as compared with inductor adjustment in previous circuit.

- **Audio IC**

The IC amplifies the audio signal from the head enough to drive the speaker in the audio section. The IC is compactly built in the ALC as a preamplifier.

2. INSTRUMENTS FOR ADJUSTMENT AND MEASUREMENT

To perform adjustment and measurement for the CRS-2024, prepare the following devices.

Tuner Section:

FM:

- FM RF signal generator (Output impedance 50 Ω)
- FM antenna matching pad (Input impedance 50 Ω, output impedance 75 Ω)
- Audio VTVM and distortion meter (Also used for other items)

AM:

- AM RF signal generator (Output impedance 50 Ω)
- AM RF signal generator test loop

Tape Section:

- Audio frequency oscillator
- Attenuator (600 Ω)
- Band pass filter
- Wow and flutter meter
- 2.5 Ω dummy load resistor
- Torque cassette (CT-100M)
- Test tape (new) for

Rec/playback	TDK AC-211
Wow and flutter meter	TEAC MTT-111
Output and signal -to-noise ratio	TEAC MTT-112 or MTT-212
Frequency response (normal) & Azimuth alignment	TEAC MTT-216
Blank tape	Completely erased

FTZ REGULATION

Instruction for the use in the range other than specified in FTZ codes.

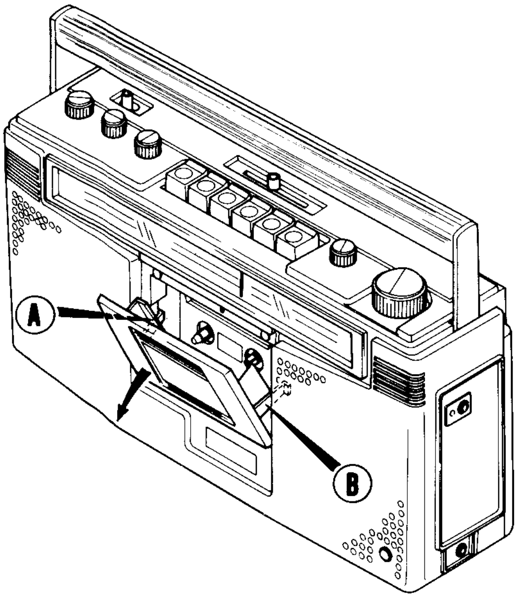
Achtung fur die Leute, die in dem Gebiet wohnen, wo die FTZ-Bestimmungen vorherrschend sind.

Sollte des Gerät auch für Frequenzen außerhalb des in den FTZ-Bestimmungen angegebenen Bereichs empfangebereit sein, bitten wir, den Bereich durch Nachstellen des Kernes in der Oszillatorspule (in der Abbildung mit "FTZ" gekennzeichnet) so zu korrigieren, dass er den Bestimmungen entspricht.

3. DISASSEMBLY

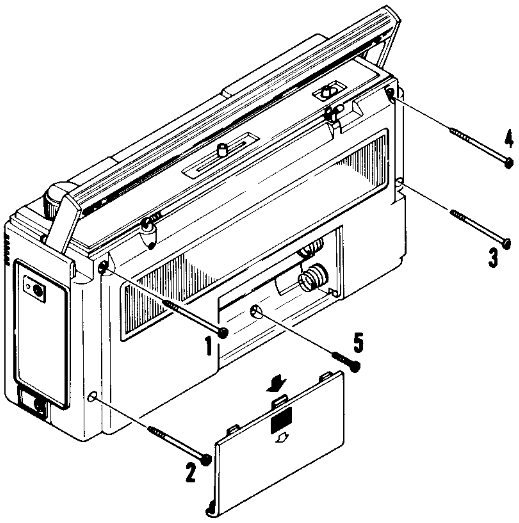
3.1 REMOVING THE CASSETTE COMPARTMENT LID

While pressing the point A and B in the arrow direction, pull the lid toward as shown. The lid will be removed.

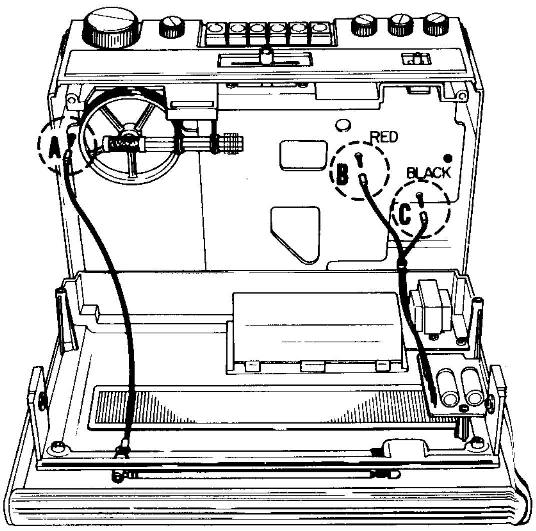


3.2 REMOVING THE BACK COVER

1. Open the battery compartment cover by depressing the finger grip and pulling down. Remove the five screws 1 through 5.

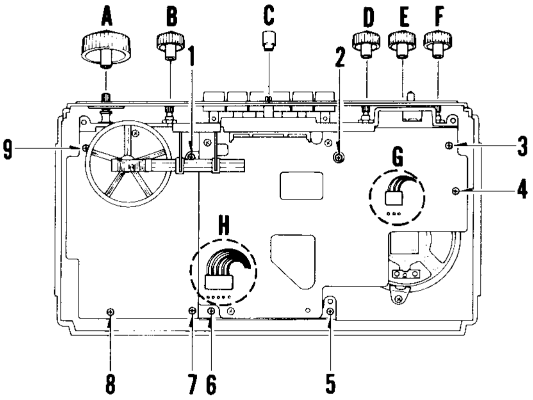


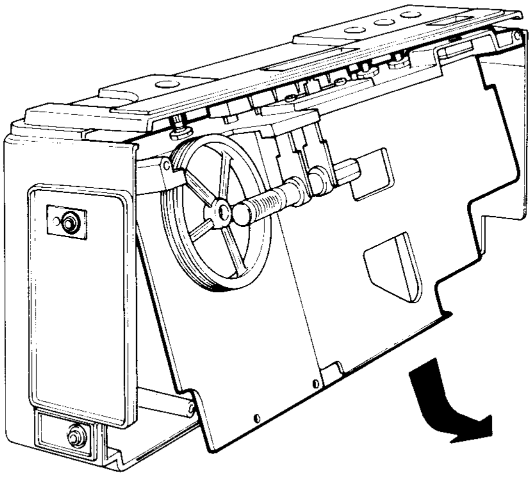
2. Disconnect the antenna lead connector A and power connectors B and C, and the back cover will come off the casing.



3.3 REMOVING THE CHASSIS

1. Remove the six knobs A through F.
   A .... TUNING
   B .... BAND
   C .... BALANCE
   D .... FUNCTION
   E .... TONE
   F .... VOLUME
2. Remove the nine screws 1 through 9.
3. Remove the speaker connector G and microphone connector H.
4. Remove the chassis as shown.





4. SERVICE GUIDE

4.1 BATTERY VOLTAGE

Many customers often determine that the set is faulty when malfunctioning as they are not aware of used-up battery. Before operation, therefore, make certain that the battery voltage is higher than 4.5 V.

4.2 BATTERY POLARITY

In loading the battery, particular care should be taken in its polarity as wrong placing may damage transistors and motor.

4.3 CLEANING THE HEADS

The head slit contaminated with tape chips and powder, rubber, dust, or dirt leads to insufficient sound volume and tone deterioration. Wipe such contaminants off the slit using soft cloth moistened with alcohol or carbon tetrachloride.

4.4 CURRENT CONSUMPTION

	VOLUME	PLAY	REC
RADIO	Maximum	800	*
	Minimum	90	*
TAPE	Maximum	800	–
	Minimum	140	160
F.F.	–	200	–
REW	–	250	–

(Units in mA)

The above values may differ slightly depending on individual sets.

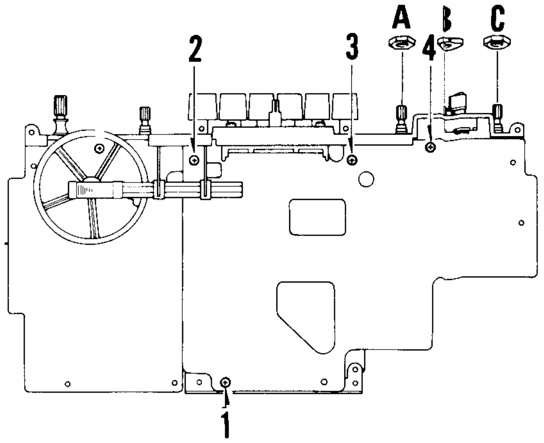
Measuring conditions (standard inputs)

Radio
  AM: 5 mV, 400 Hz, 30% mod.
  FM: 1 mV, 400 Hz, 30% mod.

Tape Recorder
  Recording: 1 mV, 1 kHz at mic input
  Playback: Test tape MTT 112 (333 Hz, 250 nwb/m)
  MTT 212 (315 Hz, 250 nwb/m)

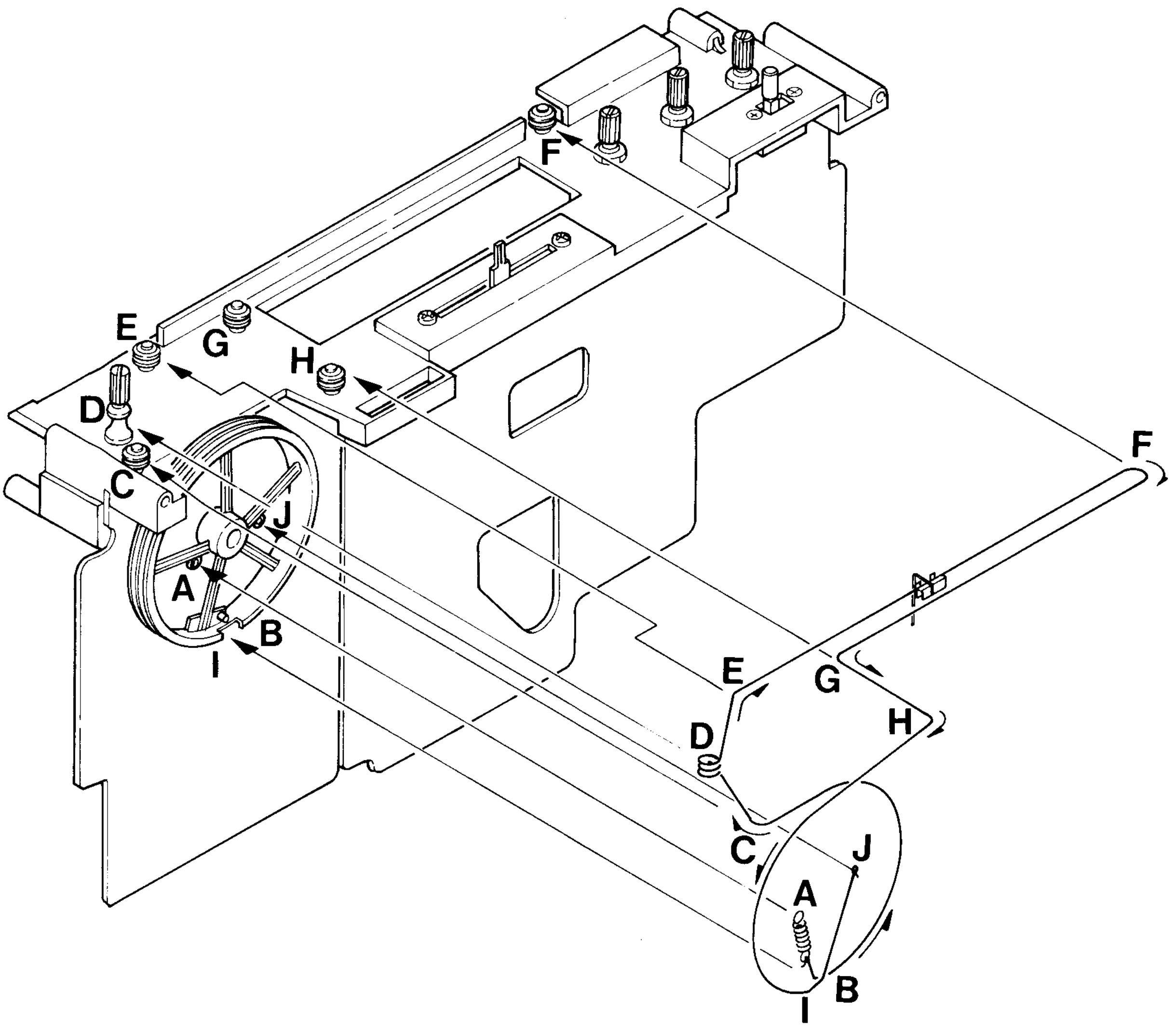
3.4 HOW TO OPEN THE AUDIO PW BOARD

Remove the nuts A through C and screws 1 through 4 from the function switch and the TONE and VOLUME knobs. Pull down the whole PW board holding its lower section, and it can be opened. Use caution to keep the ferrite bar antenna clear from other wires.



5. DIAL STRINGING

Perform dial stringing referring to the illustration.


F
E
G
H
D
C
J
A
B
I
F
E
G
H
D
C
J
A
B
I

6. MECHANICAL ADJUSTMENTS

PRECAUTIONS: Prior to any adjustments, clean the head slits with soft cloth or cotton swab moistened with denatured alcohol or carbon tetrachloride, and fully demagnetize the head, capstan and similar parts.

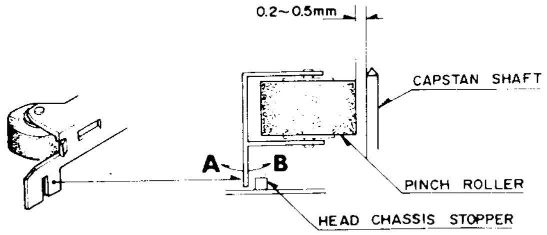
6.1 CHECKING THE PLAY OPERATION

6.1.1 Checking the Play Timing

It is normal that when the PLAY pushbutton is depressed, the take-up reel table turns first, then the pinch roller is rotated. The reel table and pinch roller must not start turning at the same time.

NOTE:
For this check, gently depress the PLAY pushbutton without loading the tape.

Slowly depress the PLAY pushbutton, and the take-up reel table will start turning. At that time, check to make certain that a clearance between the pinch roller and capstan is less than 0.5mm.



6.1.2 Adjusting the Play Timing

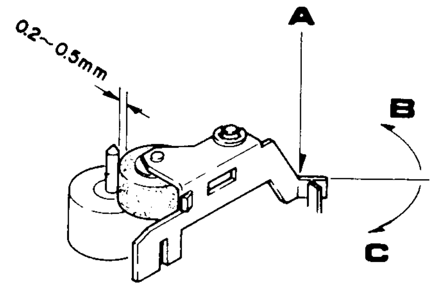
If out of specification, bend the part of the pinch roller bracket which faces the head chassis stopper. In the figure shown, bend the part in the direction of A to decrease the clearance. To increase the clearance, bend the part in the direction of B.

NOTE:
After adjustment, check to be sure that the pinch roller bracket does not contact the head chassis stopper in PLAY mode.

6.2 ADJUSTING THE PAUSE TIMING

Set the recorder in the playback mode. Depress the PAUSE pushbutton slowly, and the take-up reel will pause. At that time, check to ensure that a clearance between the pinch roller and the capstan ranges from 0.2 to 0.5 mm. If out of the range, adjust a bending angle of the pinch roller bracket arm (part A).

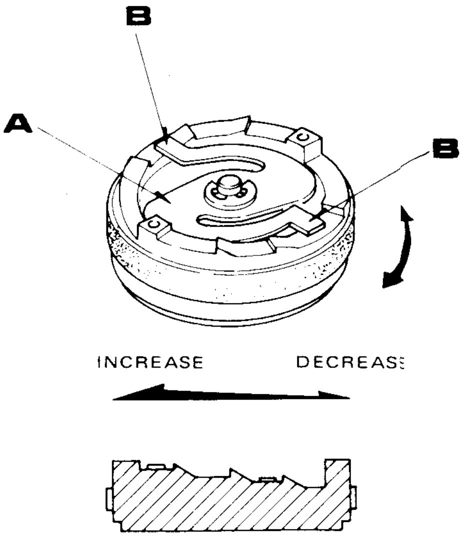
NOTE:
To increase a clearance between the pinch roller and capstan, decrease the angle (in the direction C). To decrease the clearance, increase the angle (in the direction B).



6.3 ADJUSTING THE FAST FORWARD AND REWIND TORQUE

Set the extended parts (B in the figure) of the torque adjustment leaf spring (A in the figure) of the FF/REW idler on any one of three stepping parts of the idler.

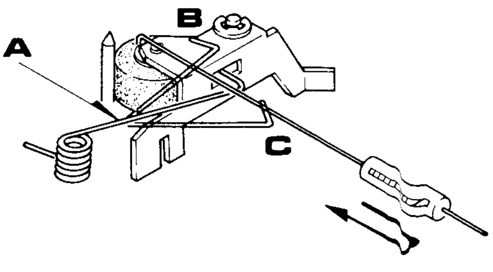
NOTE:
To increase torque, set the extended parts to the stepping part of "INCREASE" and to decrease it, set those to the stepping part of "DECREASE".
Adjusting range 70 to 110 g·cm



6.4 ADJUSTING THE PINCH ROLLER PRESSURE

Measure the pressure of the pinch roller using a gauge as shown. For measurement, draw the pinch roller in the arrow direction in which it is detached from the capstan shaft and gradually return it toward the capstan. Read the gauge at the time when the pinch roller starts turning. The standard pressure is 300±50 g. If the pressure is out of the range, bend the pinch roller spring around the point A in the direction B or C.

NOTE:
To make the pressure strong, bend in the direction B. To make the pressure weak, bend in the direction C.



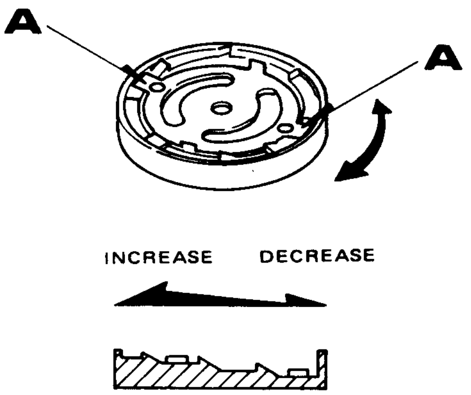
6.5 ADJUSTING THE PLAY TORQUE

Mount the extended parts A (two) of the disc leaf spring on any one of the stepping parts of the idler.
Adjusting range: 40 to 70 g·cm

NOTES:

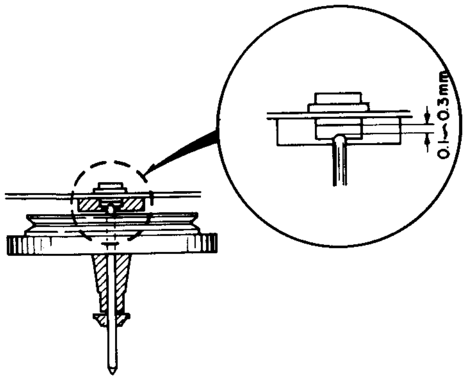
(1) To increase torque, mount the extended parts on "INCREASE" and to decrease torque, mount them on "DECREASE".

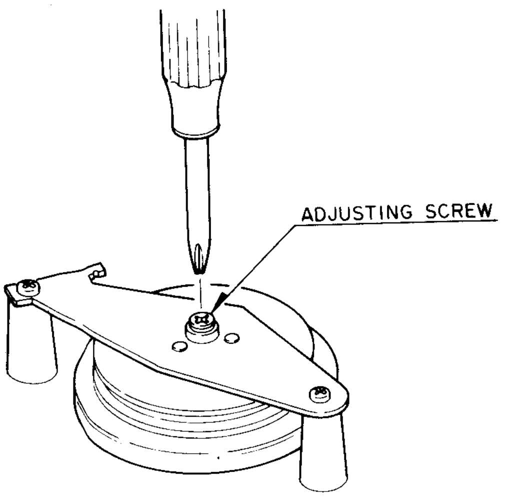
(2) Check the take-up clutch for slipping. When the reel base is paused, the wheel must smoothly rotate. The wheel, when irregularly rotating or stopping, is not acceptable.



6.6 ADJUSTING THE FLYWHEEL THRUST

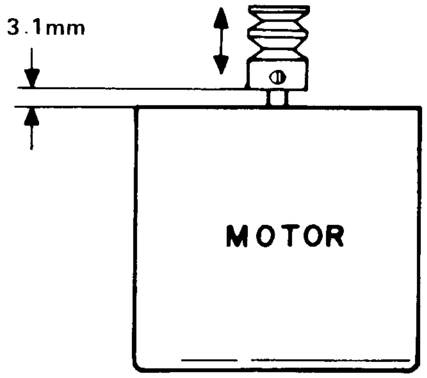
Adjust the thrust screw at the flywheel bracket until the clearance between the capstan tail end and thrust bearing is 0.1 to 0.3 mm as shown, using a philips screw driver. For adjusting, feel of axial dropping of the flywheel for proper clearance as this cannot been seen through. Then paint the screw to lock.





6.7 POSITIONING THE MOTOR PULLEY

Check to ensure that a clearance between the DC motor and pulley is 3.1 mm. If out of specification, reposition the pulley as shown.



6.8 ADJUSTING THE TAPE SPEED

Play the 3 kHz test tape back, and check to make sure that the meter pointer of a frequency counter indicates 3000 Hz ±3% or less as specified. If a measured value is more than 3000 Hz ±3%, replace the pulley with one of parts No. 4367262050. If the value is less than 3000 Hz −30%, replace it with one of parts No. 4367262040.

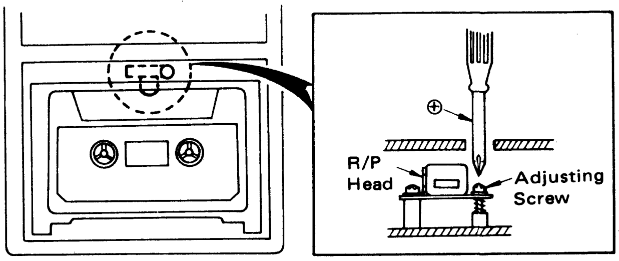
7. ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

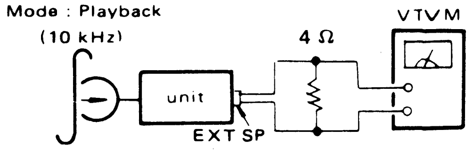
Precautions for Adjustment and Measurement

1. The voltage at any electirical point may vary with the input signal, so make measurements of voltage under no signal condition.
2. Transistors are affected by microvoltage. Whenever measuring on them, use a VTVM having a high internal resistance and high input sensitivity enough to minimize errors in measurement.
3. In adjustment or measurement, set the TONE control to MAX unless otherwise specified.
4. For measurements of outputs, current drain and maximum sensitivity of FM and AM, connect a pure 2.5 Ω resistor across the external speaker terminal and use a VTVM. Unless otherwise specified, connect the 4 Ω pure/resistor across the external speaker terminal and adjust the VOLUME control for the standard output level, 50 mW (0.35 V/2.5 Ω).

7.1 ADJUSTING THE HEAD AZIMUTH

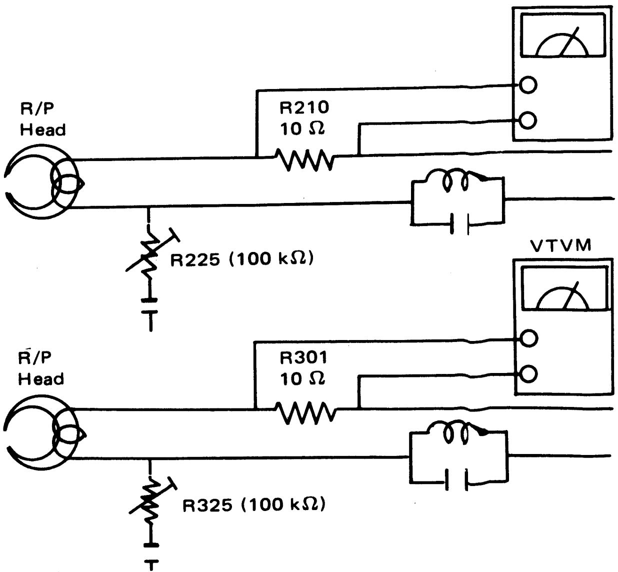
Connect a VTVM across the EXT SP jack. Play the 10 kHz signal of the test tape MTT 216 back. Turn the adjusting screw until the output voltage is maximum. If the maximum voltages of the both channels are different, adjust the across to a point at which the output levels of both channels are identical. After adjustment, be sure to paint the adjusting screws to lock.

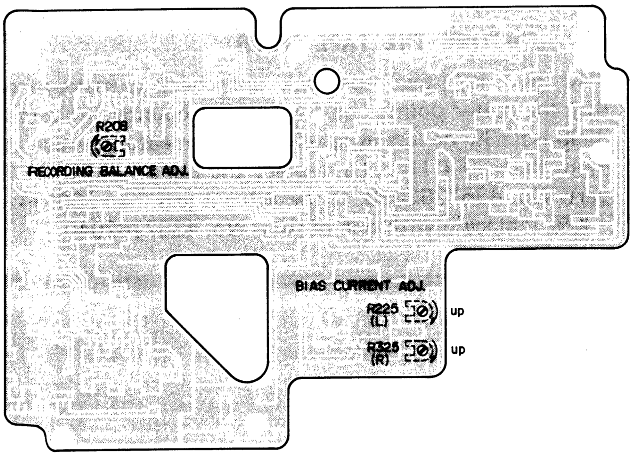

⊕
R/P Head
Adjusting Screw


Mode : Playback
(10 kHz)
4 Ω
VTVM
unit
EXT SP

7.2 ADJUSTING THE BIAS CURRENT

Set the power voltage to 6 V and set the recorder in the recording mode at no signal condition. Adjust the semifixed resistors R225 and R325 until the voltages across R201 and R301 are 6 mV. The bias current will increase by turning the semifixed resistors R225 and R325 counter-clockwise as viewed from the pattern side.


VTVM
R/P Head
R210
10 Ω
R225 (100 kΩ)
VTVM
R/P Head
R301
10 Ω
R325 (100 kΩ)


R208
RECORDING BALANCE ADJ.
BIAS CURRENT ADJ.
R225 (L)
up
R325 (R)
up

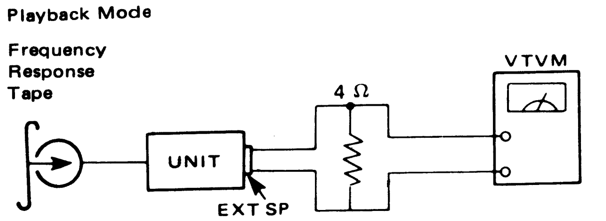
Adjusting Controls in Audio Section, CRS-2024

7.3 ADJUSTING RECORDING BALANCE

Set the function switch to "TAPE". Apply a signal of 1 kHz, 3 mV to each external microphone terminal. Set the recorder in recording mode. Contact a VTVM with the negative (-) terminals of the C222 and C322. Under that condition, adjust the R208 until the individual voltage levels are identical. If approx. 0.8 V is measured, this is normal.

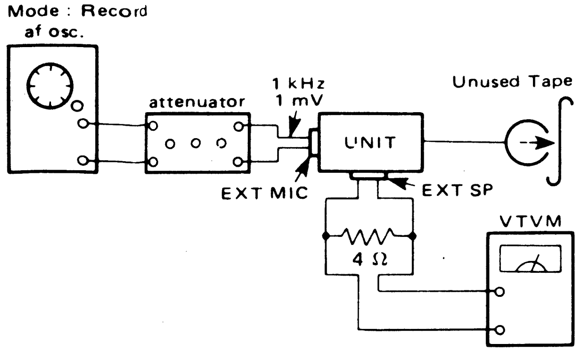
7.4 MEASURING PLAYBACK FREQUENCY RESPONSE

Play the test tape MTT-216 for frequency response measurement back. Adjust the VOLUME knob until a reference signal of 315 Hz has 50 mW (0.45 V, 4 Ω) at the external speaker terminal. Set the level of the 315 Hz signal recorded at a level down 20 dB to 0 dB. Measure the output voltage of each frequency.


Playback Mode
Frequency Response Tape
UNIT
EXT SP
4 Ω
VTVM

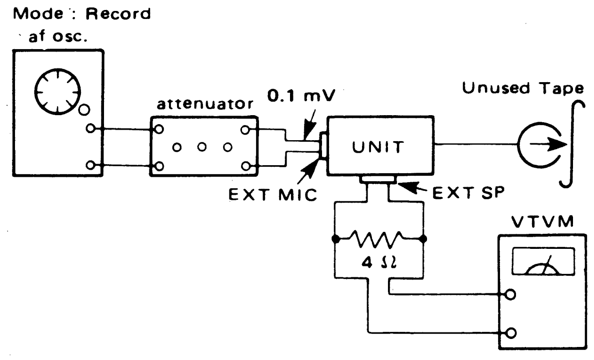
7.5 MEASURING THE SIGNAL-TO-NOISE RATIO IN RECORDING/PLAYBACK MODE

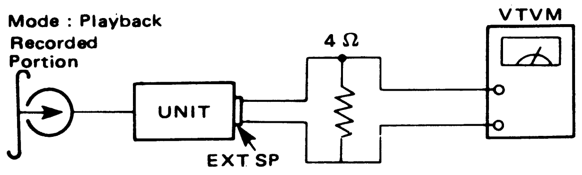
Impose a signal of 1 kHz, 1 mV from the AF oscillator on each EXT. MIC jack. Connect a 4 Ω dummy load resistor to a VTVM and connect the resistor to the EXT. speaker jack. Record the signal of 1 kHz, 1 mV on new cassette tape. Insert the short plug into the EXT. MIC jack and under that condition, perform no signal recording.
Playing back the recorded part of the tape, adjust the VOLUME knob until the output reaches 50 mW (4 Ω, 0.45 V). Obtain the ratio of a 0 dB reference level on 50 mW to noise level recorded under no-signal input through measurement. If more than 42 dB and 39 dB are measured in the S/N ratio in both DC and AC power operations, this is acceptable.


Mode : Record
af osc.
attenuator
1 kHz
1 mV
UNIT
Unused Tape
EXT MIC
EXT SP
4 Ω
VTVM

7.6 MEASURING THE COMBINED RECORDING AND PLAYBACK FREQUENCY RESPONSE

Record a signal of 1 kHz, 0.1 mV on unused tape. Vary the signal frequency and rerecord a varied signal. Playing back the 1 kHz signal, adjust the VOLUME knob until the output is set to 0.5 mW (4 Ω, 45 mV). Measure difference between a 0 dB reference level on a 0.5 mW output and other frequency output levels.
The standard frequency response is +3 dB to -4 dB at 250 Hz and +2 dB to -8 dB at 6 kHz.

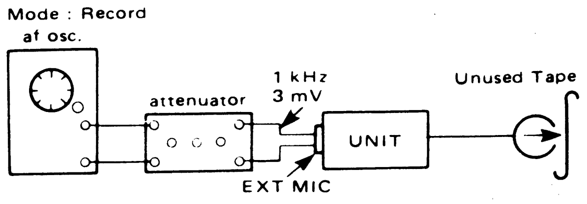

Mode : Record
af osc.
attenuator
0.1 mV
Unused Tape
UNIT
EXT MIC
EXT SP
4 Ω
VTVM

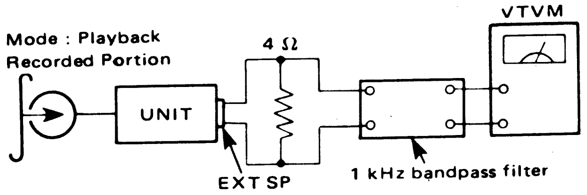

Mode : Playback
Recorded Portion
UNIT
EXT SP
4 Ω
VTVM

7.7 MEASURING THE ERASING EFFECT

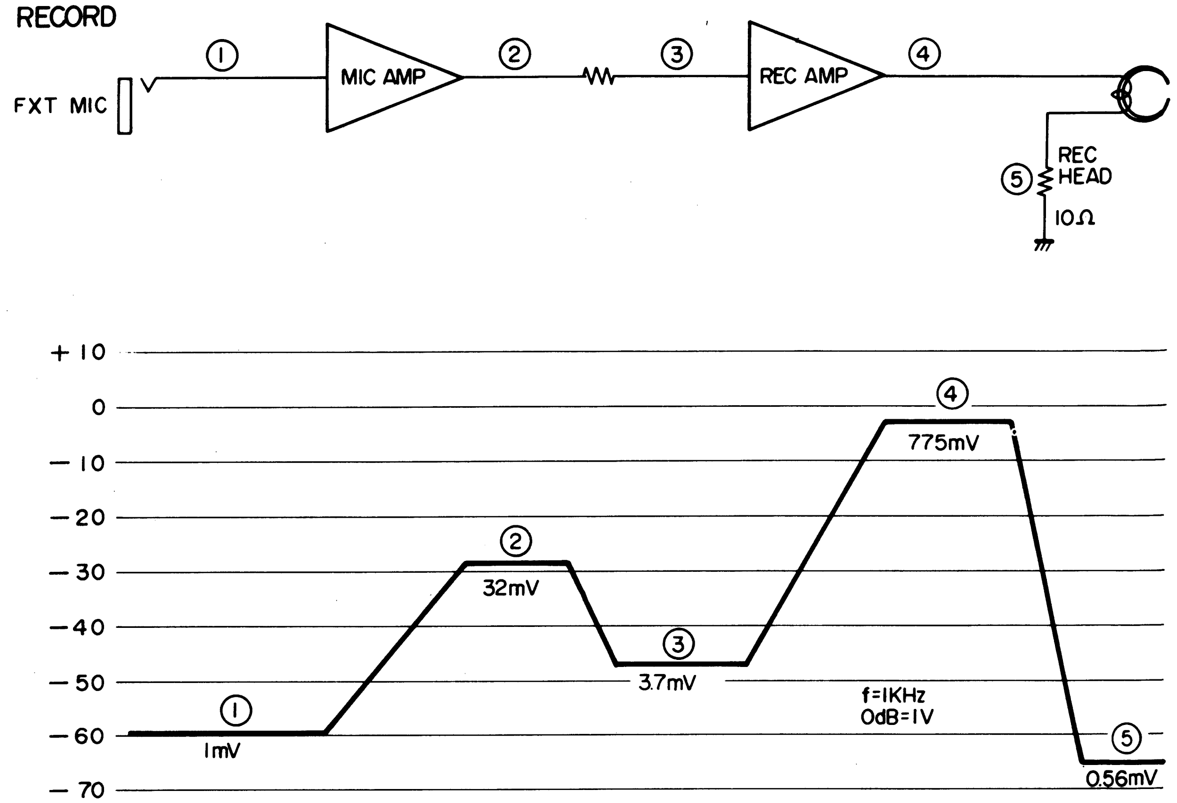
Record a signal of 1 kHz, 3 mV on unused tape. Rewind the half of the recorded part and insert the erasing plug into each EXT. MIC jack to erase the recorded signal. Playing back the recorded part, adjust the VOLUME knob until the output reaches 50 mW (0.45 V). Compare a 0 dB reference level on 50 mW output with the playback output level of the erased part.

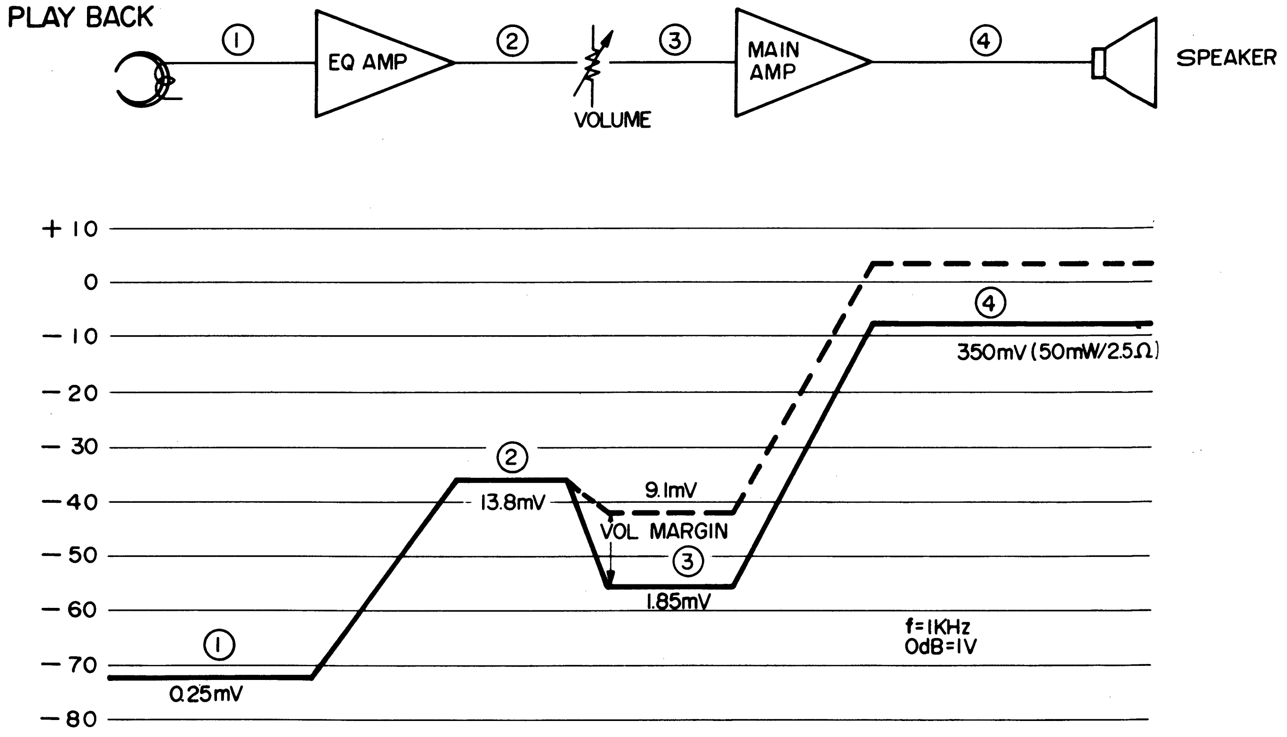
NOTE:
Use a 1 kHz band pass filter for this measurement. The standard erasing effect is more than 55 dB.


Mode : Record
af osc.
attenuator
1 kHz
3 mV
Unused Tape
UNIT
EXT MIC


Mode : Playback
Recorded Portion
4 Ω
VTVM
UNIT
EXT SP
1 kHz bandpass filter

8. LEVEL DIAGRAM



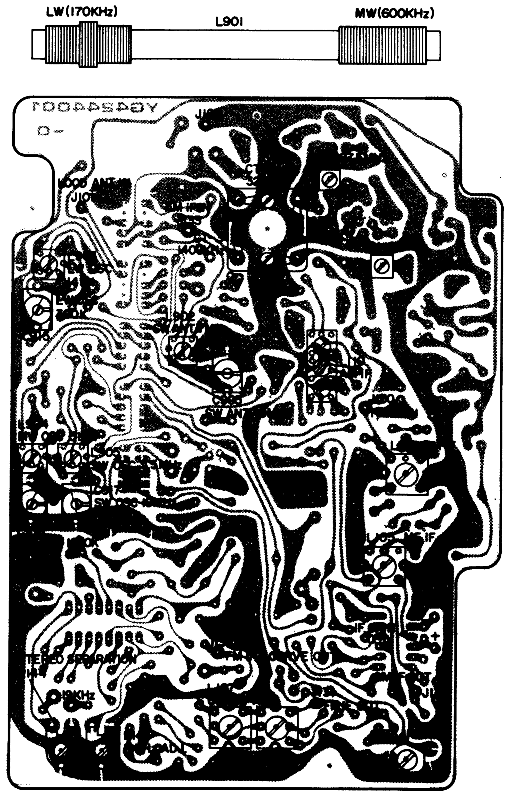


9. ALIGNMENT PROCEDURES

9.1 FM ALIGNMENT PROCEDURE

(BAND switch in "FM", MODE switch in "MONO" and FUNCTION switch in "RADIO/AUX".)

Step	Connect Signal Generator to:	Set Signal Frequency to: Marker to:	Set Tuning Dial to:	Indicator Connection	Adjust:	Procedure
	FM, IF ratio detector alignment procedure					
1	J130 Ground to J103	10.7 MHz sweep Marker: 10.6 MHz 10.7 MHz 10.8 MHz	–	Oscilloscope vertical connector to J131 thru diode	L104 L105 L106	Adjust inductors for highest and symmetric curve
2				Oscilloscope vertical connector to J132	L107	Turn cores until S curve is symmetric in all directions at the midposition of single peak frequency
3	Repeat Steps 1 and 2.					
	FM, RF tracking alignment procedure					
1	J101 Ground to J103	87.5 MHz with modulation	87.5 MHz (max. capacitance)	VTVM across EXT SP jack	L102 (OSC coil)	Adjust for max. output
2		109 MHz with modulation	109 MHz (min. capacitance)		CT-1 (trimmer)	
3		90 MHz with modulation	90 MHz		L101	
4		106 MHz with modulation	106 MHz		CT-2 (trimmer)	
5	Repeat Steps 1 and 4.					



Adjusting Point on Tuner PW Board

9.2 FM STEREO SEPARATION ALIGNMENT PROCEDURE

(BAND switch in "FM" and MODE switch in "RADIO".)

Step	Connect Signal Generator to:	Set Signal Frequency to:	Set Tuning Dial to:	Indicator Connection	Adjust	Procedure
1	J101	–	98 MHz.	Frequency counter to J106, J118	R145	Adjust semifixed resistor so that frequency counter reading in 19 kHz is mechanical center.
2		L channel		VTVM to EXT SP jack	R144.	Adjust semifixed resistor for min. output in R channel.
3		R channel				Adjust semifixed resistor for min. output in L channel.
4	Repeat Steps 2 and 3.					

9.3 MW ALIGNMENT PROCEDURE

(BAND switch in "MW" and FUNCTION switch in "RADIO".)

Step	Connect Signal Generator to:	Set Signal Frequency to:	Set Tuning Dial to:	Indicator Connection	Adjust	Procedure
1	J133	455 kHz with ±35 kHz sweep.		Oscilloscope vertical connector to J134, G(J112) through diode.	L110	Set function switch to "MW" Turn each core until wave form on oscilloscope is maximized and symmetrical.
2	Indirect coupling near set antenna coil.	515 kHz with modulation.	515 kHz (max. capacitance).	VTVM across EXT SP jack.	L904 (OSC coil).	Adjust for max. output.
3		1650 kHz with modulation.	1650 kHz (min. capacitance).		C916 (trimmer).	
4			Repeat Steps 2 and 3.			
5	Indirect coupling near set antenna coil.	600 kHz with modulation.	600 kHz.	VTVM across EXT SP jack.	L901 (antenna coil).	Adjust for max. output.
6		1400 kHz with modulation.	1400 kHz.		CT-3 (trimmer.	
7	Repeat Steps 5 and 6.					

NOTE:

1. In adjustment, connect the signal generator grounding terminal (–) to that of the set.
2. Modulate the signal generator to 30% with a 400 Hz signal.
3. Reduce the signal generator as low as possible.
4. Set the VOLUME control for the maximum level.

9.4 FM/MW IF Gain

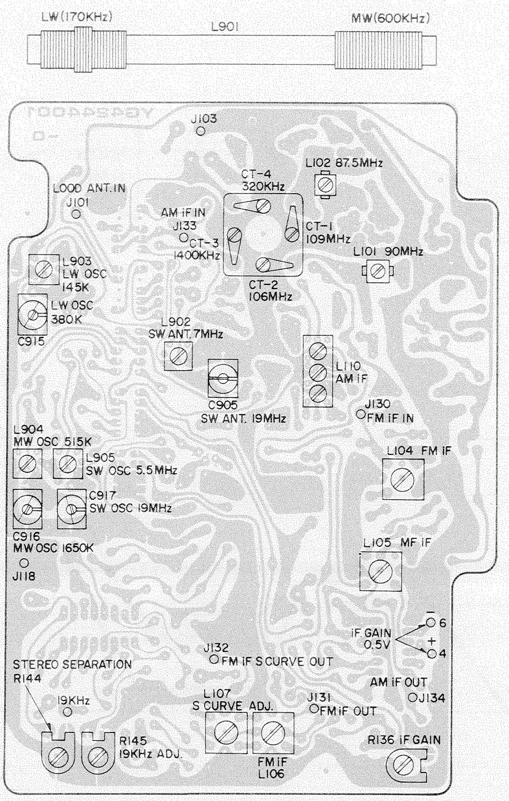
Connect a DC voltmeter across pins 4 and 6 of Q106, LA-1201. Adjust the semifixed resistor R136 until 0.5V is measured under no signal.
Pin 4 to the positive (+) terminal of the voltmeter.

9. ALIGNMENT PROCEDURES

9.1 FM ALIGNMENT PROCEDURE

(BAND switch in "FM", MODE switch in "MONO" and FUNCTION switch in "RADIO/AUX".)

Step	Connect Signal Generator to:	Set Signal Frequency to: Marker to:	Set Tuning Dial to:	Indicator Connection	Adjust:	Procedure
	FM, IF ratio detector alignment procedure					
1	J130 Ground to J103	10.7 MHz sweep	—	Oscilloscope vertical connector to J131 thru diode	L104 L105 L106	Adjust inductors for highest and symmetric curve
2		Marker: 10.6 MHz 10.7 MHz 10.8 MHz		Oscilloscope vertical connector to J132	L107	Turn cores until S curve is symmetric in all directions at the midposition of single peak frequency
3	Repeat Steps 1 and 2.					
	FM, RF tracking alignment procedure					
1	J101 Ground to J103	87.5 MHz with modulation	87.5 MHz (max. capacitance)	VTVM across EXT SP jack	L102 (OSC coil)	Adjust for max. output
2		109 MHz with modulation	109 MHz (min. capacitance)		CT-1 (trimmer)	
3		90 MHz with modulation	90 MHz		L101	
4		106 MHz with modulation	106 MHz		CT-2 (trimmer)	
5	Repeat Steps 1 and 4.					


LW(170KHz)
L901
MW(600KHz)
J103
LOOD ANT.IN
J101
L102 87.5MHz
CT-4
320KHz
AM IF IN
J133
CT-3
1400KHz
CT-1
109MHz
L101 90MHz
CT-2
106MHz
L903
LW OSC
145K
LW OSC
380K
C915
L902
SW ANT. 7MHz
L110
AM IF
C905
SW ANT. 19MHz
J130
FM IF IN
L904
MW OSC 515K
L905
SW OSC 5.5MHz
L104 FM IF
C917
SW OSC 19MHz
C916
MW OSC 1650K
J118
L105 MF IF
IF GAIN
0.5V
6
4
J132
FM IF S CURVE OUT
STEREO SEPARATION
R144
AM IF OUT
J134
19KHz
L107
S CURVE ADJ.
J131
FM IF OUT
R145
19KHz ADJ.
FM IF
L106
R136 IF GAIN

Adjusting Point on Tuner PW Board

9.2 FM STEREO SEPARATION ALIGNMENT PROCEDURE

(BAND switch in "FM" and MODE switch in "RADIO".)

Step	Connect Signal Generator to:	Set Signal Frequency to:	Set Tuning Dial to:	Indicator Connection	Adjust	Procedure
1	J101	—	98 MHz.	Frequency counter to J106, J118	R145	Adjust semifixed resistor so that frequency counter reading in 19 kHz is mechanical center.
2		L channel		VTVM to EXT SP jack	R144.	Adjust semifixed resistor for min. output in R channel.
3		R channel				Adjust semifixed resistor for min. output in L channel.
4	Repeat Steps 2 and 3.					

9.3 MW ALIGNMENT PROCEDURE

(BAND switch in "MW" and FUNCTION switch in "RADIO".)

Step	Connect Signal Generator to:	Set Signal Frequency to:	Set Tuning Dial to:	Indicator Connection	Adjust	Procedure
1	J133	455 kHz with ±35 kHz sweep.		Oscilloscope vertical connector to J134, G(J112) through diode.	L110	Set function switch to "MW" Turn each core until wave form on oscilloscope is maximized and symmetrical.
2	Indirect coupling near set antenna coil.	515 kHz with modulation.	515 kHz (max. capacitance).	VTVM across EXT SP jack.	L904 (OSC coil).	Adjust for max. output.
3		1650 kHz with modulation.	1650 kHz (min. capacitance).		C916 (trimmer).	
4			Repeat Steps 2 and 3.			
5	Indirect coupling near set antenna coil.	600 kHz with modulation.	600 kHz.	VTVM across EXT SP jack.	L901 (antenna coil).	Adjust for max. output.
6		1400 kHz with modulation.	1400 kHz.		CT-3 (trimmer).	
7			Repeat Steps 5 and 6.			

NOTE:
1. In adjustment, connect the signal generator grounding terminal (–) to that of the set.
2. Modulate the signal generator to 30% with a 400 Hz signal.
3. Reduce the signal generator as low as possible.
4. Set the VOLUME control for the maximum level.

9.4 FM/MW IF Gain

Connect a DC voltmeter across pins 4 and 6 of Q106, LA-1201. Adjust the semifixed resistor R136 until 0.5V is measured under no signal.
Pin 4 to the positive (+) terminal of the voltmeter.

9.5 LW ALIGNMENT

(BAND switch in "LW" and FUNCTION switch in "RADIO".)

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Dial Setting of the Unit	Adjustment
1	Radiate the output to the ANT. coil	145 kHz with mod.	VTVM to EXT. SPKR terminal	145 kHz tuning gang closed	Osc. coil L903 for maximum
2		380 kHz with mod.		380 kHz tuning gang closed	Trimmer C915 for maximum
3		Repeat steps 1 and 2.			
4		170 kHz with mod.	VTVM to EXT. SPKR terminal	170 kHz	ANT. coil L901 for maximum
5		320 kHz with mod.		320 kHz	Trimmer CT-4 for maximum
6		Repeat steps 4 and 5.			

Note: 1. For all alignment operations, connect the low side of the signal generator to the "common negative" wiring.
2. Signal generator output should be modulated at 400Hz and 30% modulation.
3. Keep the output as low as possible.
4. Set the volume control at maximum.

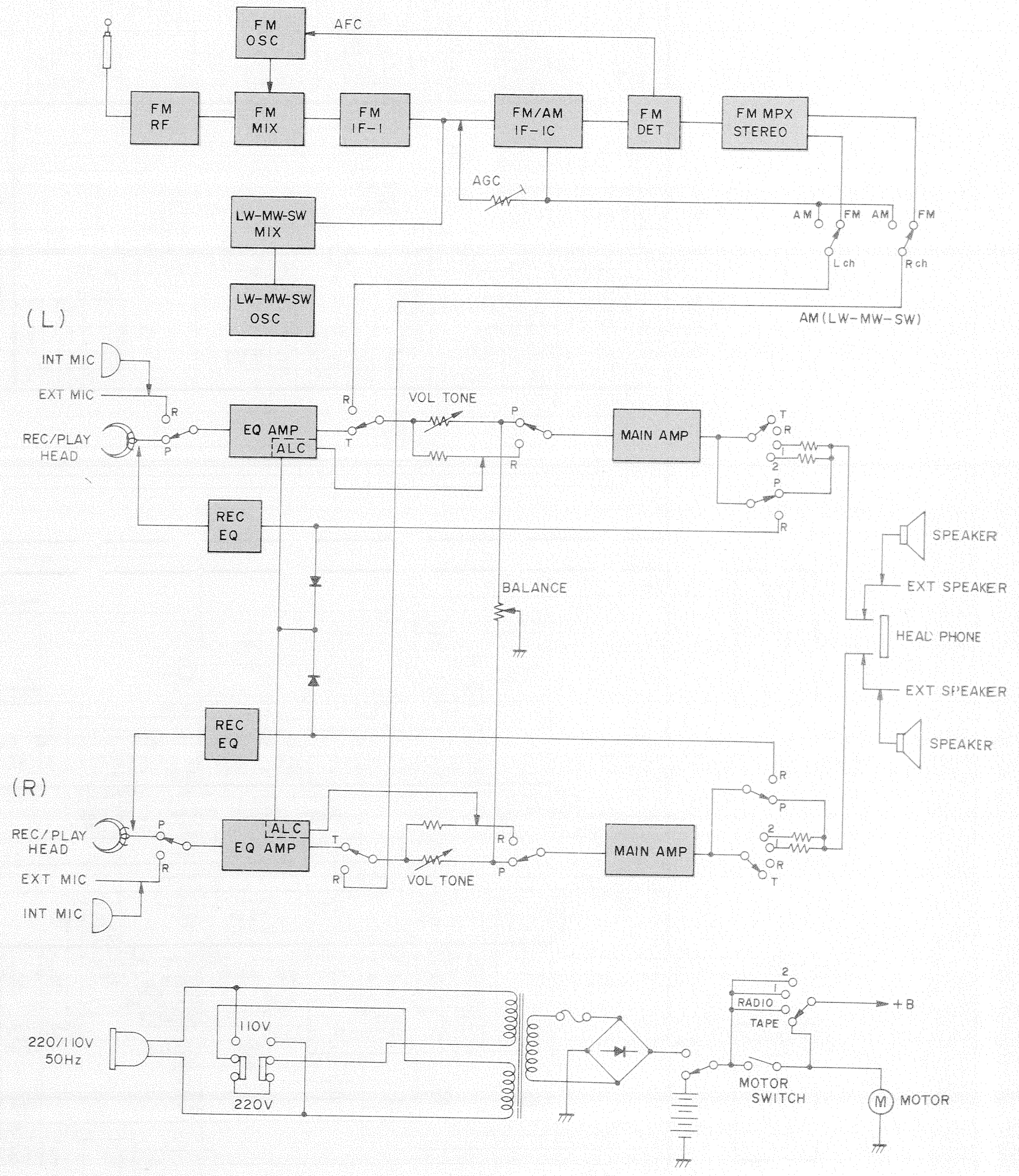
9.6 SW ALIGNMENT

(BAND switch in "SW" and FUNCTION switch in "RADIO".)

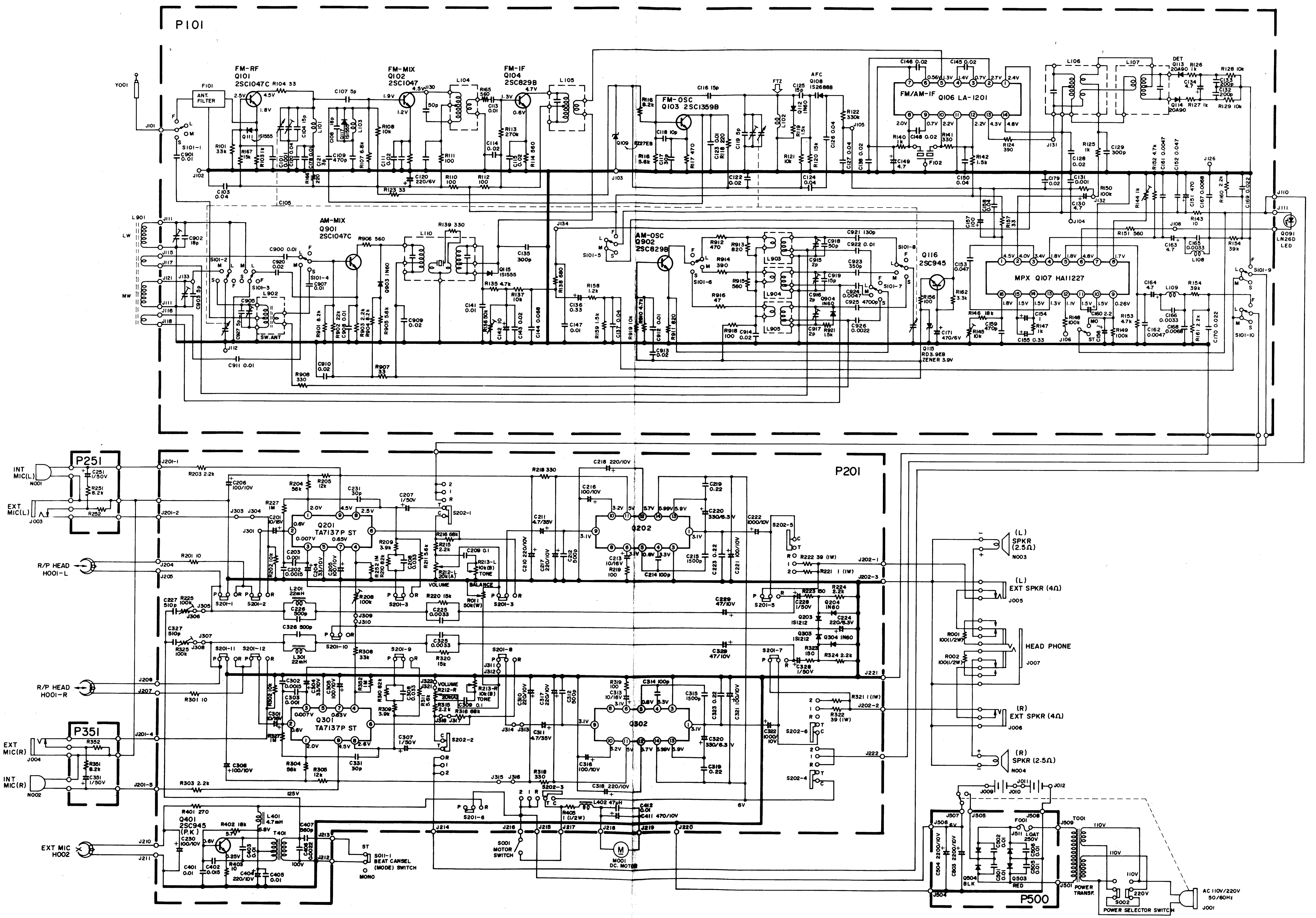
Step	Signal Source Connection	Signal Frequency	Indicator Connection	Dial Setting of the Unit	Adjustment
1	RF generator to ANT. terminal J101 Ground J103	5.5 MHz with mod.	VTVM to EXT. SPKR terminal	5.5 MHz tuning gang closed	Osc. L905 for maximum
2		19 MHz with mod.		19 MHz tuning gang open	Trimmer C917 for maximum
3		Repeat steps 1 and 2.			
4		7 MHz with mod.	VTVM to EXT. SPKR terminal	7 MHz	ANT. coil L902 for maximum
5		19 MHz with mod.		19 MHz	Trimmer C905 for maximum
6		Repeat steps 4 and 5.			

Note: 1. For all alignment operations, connect the low side of the signal generator to the "common negative"wiring.
2. Signal generator output should be modulated at 400Hz and 30% modulation.
3. Keep the output as low as possible.
4. Set the volume control at maximum.

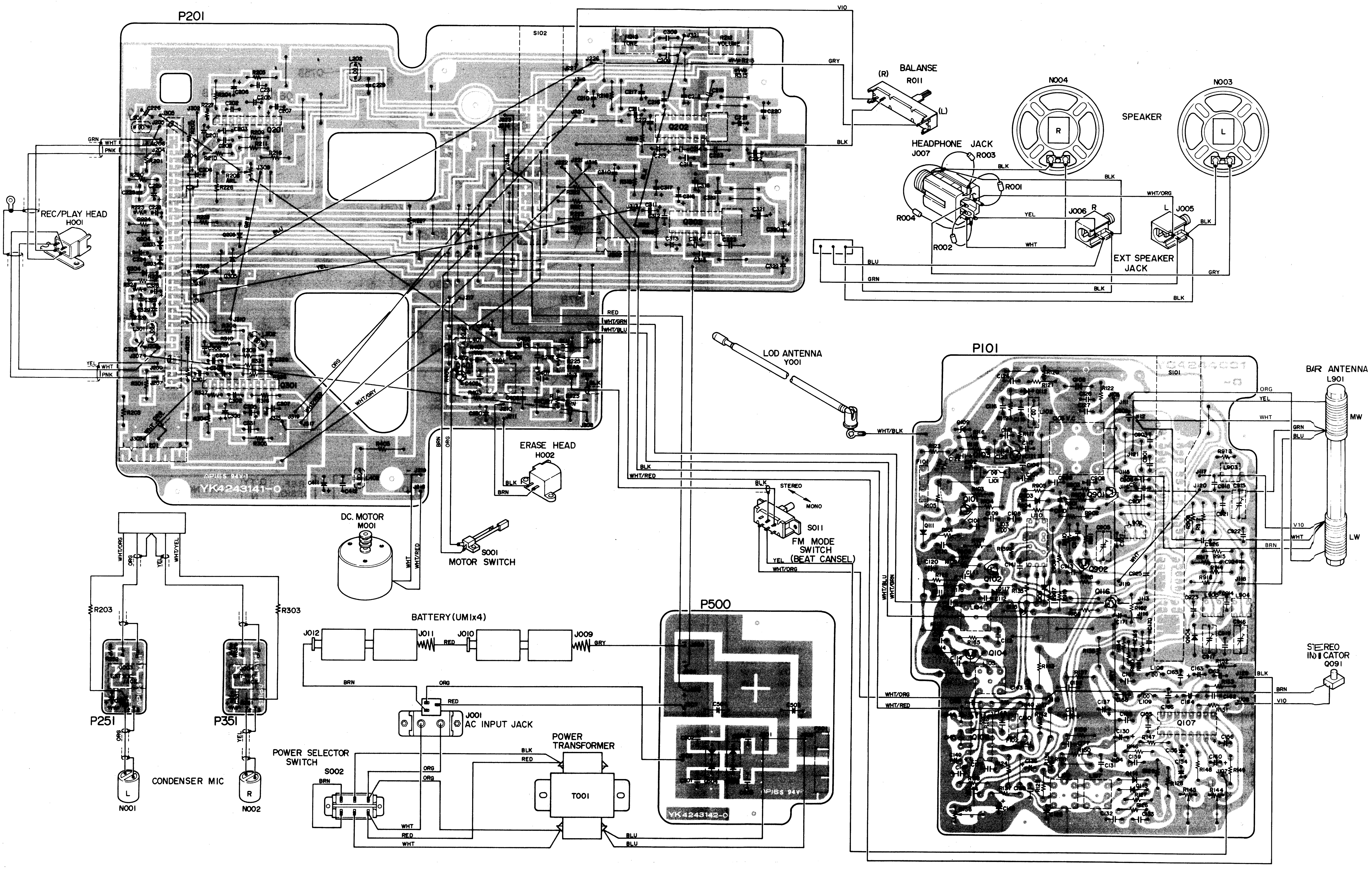
10. BLOCK DIAGRAM


FM OSC
AFC
FM RF
FM MIX
FM IF-I
FM/AM IF-IC
FM DET
FM MPX STEREO
AGC
AM
FM
AM
FM
L ch
R ch
LW-MW-SW MIX
LW-MW-SW OSC
AM (LW-MW-SW)
(L)
INT MIC
EXT MIC
REC/PLAY HEAD
R
P
EQ AMP
ALC
VOL TONE
MAIN AMP
T
R
P
REC EQ
BALANCE
SPEAKER
EXT SPEAKER
HEAD PHONE
EXT SPEAKER
SPEAKER
REC EQ
(R)
REC/PLAY HEAD
EXT MIC
INT MIC
ALC
EQ AMP
VOL TONE
MAIN AMP
220/110V 50Hz
110V
220V
RADIO
TAPE
+B
MOTOR SWITCH
MOTOR
M

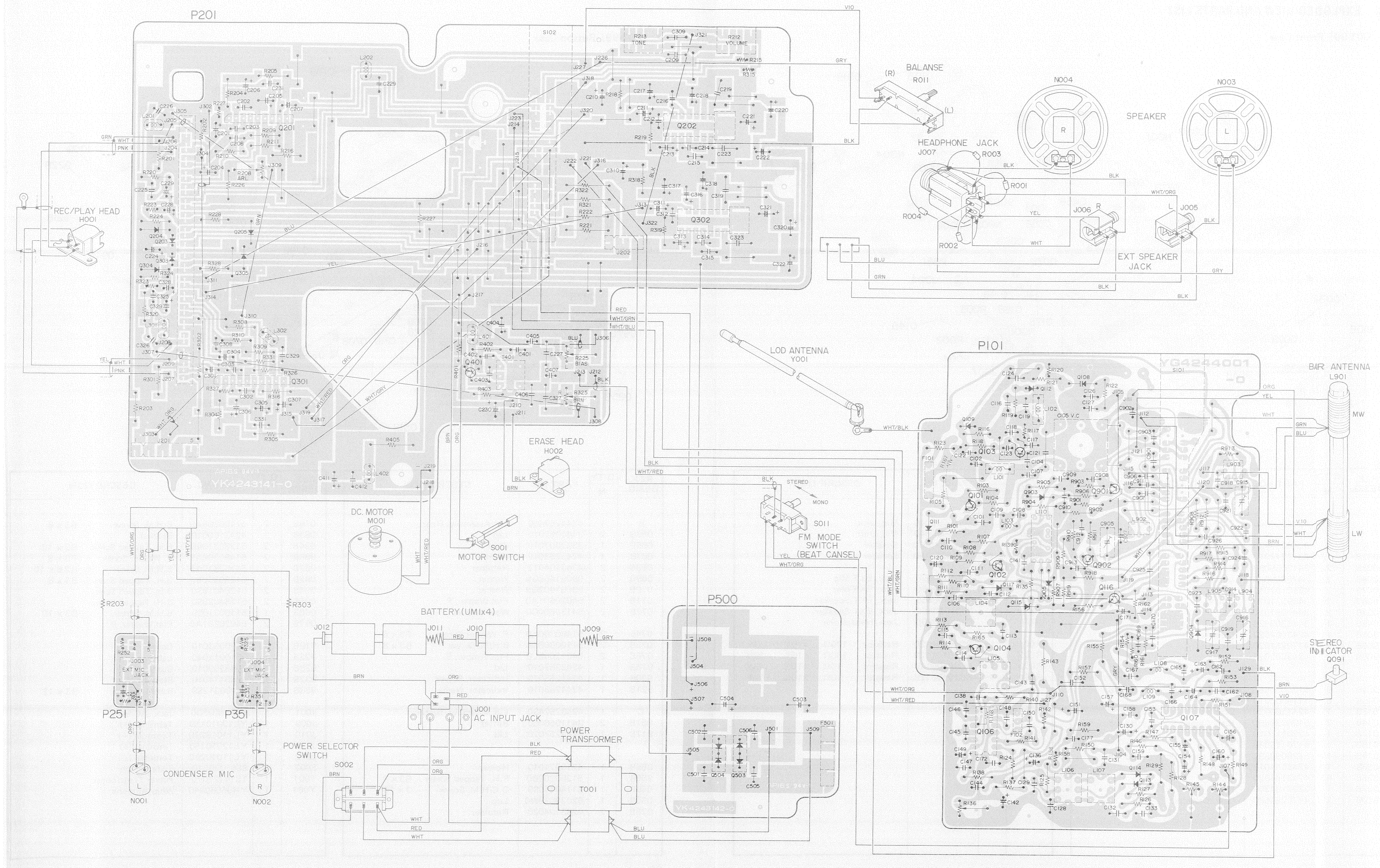
11. SCHEMATIC DIAGRAM


P101
FM-RF Q101 2SC1047C
FM-MIX Q102 2SC1047
FM-IF Q104 2SC829B
FM-OSC Q103 2SC1359B
AFC Q108 1S2688
FM/AM-IF Q106 LA-1201
DET Q113 Q114
AM-MIX Q901 2SC1047C
AM-OSC Q902 2SC829B
Q116 2SC945
MPX Q107 HA11227
Q091 LN26D LED
Q115 RD3.9EB ZENER 3.9V
ANT. FILTER
Y001
P201
P251
P351
INT MIC(L) N001
EXT MIC(L) J003
R/P HEAD H001-L
R/P HEAD H001-R
EXT MIC(R) J004
INT MIC(R) N002
Q201 TA7137P ST
Q301 TA7137P ST
Q202
Q302
VOLUME
BALANCE
TONE
(L) SPKR (2.5Ω) N003
(L) EXT SPKR (4Ω) J005
HEAD PHONE J007
(R) EXT SPKR (4Ω) J006
(R) SPKR (2.5Ω) N004
EXT MIC H002
Q401 2SC945 (P.K)
T401
S011-1 BEAT CANSEL (MODE) SWITCH
MONO
S001 MOTOR SWITCH
M001 DC. MOTOR
P500
POWER TRANSF. T001
POWER SELECTOR SWITCH S002
AC 110V/220V 50/60Hz J001

12. CIRCUIT BOARD DIAGRAM

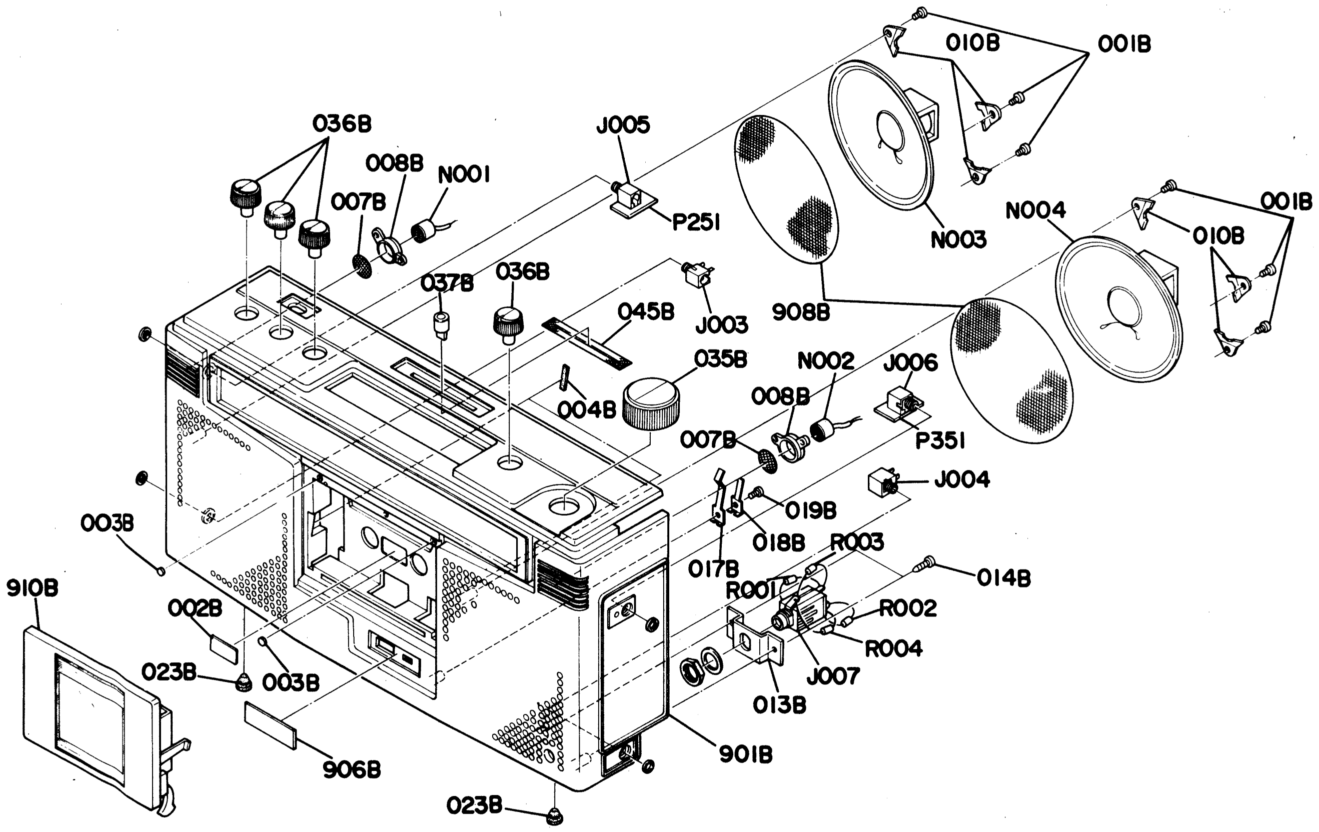

P201
S102
VIO
GRY
BLK
BALANSE
R011
(R)
(L)
N004
N003
SPEAKER
R
L
HEADPHONE JACK
J007
R003
R001
R004
R002
J006
J005
EXT SPEAKER JACK
BLU
GRN
WHT
YEL
WHT/ORG
REC/PLAY HEAD
H001
PNK
RED
WHT/GRN
WHT/BLU
LOD ANTENNA
Y001
WHT/BLK
P101
S101
BAR ANTENNA
L901
MW
LW
ORG
ERASE HEAD
H002
BRN
DC. MOTOR
M001
S001
MOTOR SWITCH
WHT/RED
STEREO
MONO
S011
FM MODE
SWITCH
(BEAT CANSEL)
P500
BATTERY (UM1x4)
J012
J011
J010
J009
J001
AC INPUT JACK
POWER SELECTOR
SWITCH
S002
POWER
TRANSFORMER
T001
CONDENSER MIC
N001
N002
P251
P351
R203
R303
WHT/YEL
STEREO
INDICATOR
Q091
Q201
Q202
Q301
Q302
Q107
YK4243141-0
YK4243142-0

12. CIRCUIT BOARD DIAGRAM


P201
YK4243141-0
REC/PLAY HEAD
H001
ERASE HEAD
H002
DC. MOTOR
M001
MOTOR SWITCH
S001
P251
P351
EXT MIC JACK
J003
J004
CONDENSER MIC
L
R
N001
N002
BATTERY (UM1x4)
J012
J011
J010
J009
J001
AC INPUT JACK
POWER SELECTOR SWITCH
S002
POWER TRANSFORMER
T001
P500
YK4243142-0
F501
FM MODE SWITCH
(BEAT CANSEL)
S011
STEREO
MONO
LOD ANTENNA
Y001
P101
YG4244001-0
BAR ANTENNA
L901
MW
LW
STEREO INDICATOR
Q091
BALANSE
R011
(R)
(L)
HEADPHONE JACK
J007
R001
R002
R003
R004
SPEAKER
N004
N003
EXT SPEAKER JACK
J006
J005
R213 TONE
R212 VOLUME
S102
S101
Q201
Q202
Q301
Q302
Q401
T401
R225 BIAS
R208 ARL
BLK
WHT
RED
BLU
GRN
YEL
ORG
BRN
GRY
PNK
WHT/ORG
WHT/RED
WHT/BLU
WHT/GRN
WHT/BLK
WHT/GRY
WHT/YEL
V10

13. EXPLODED VIEW AND PARTS LIST

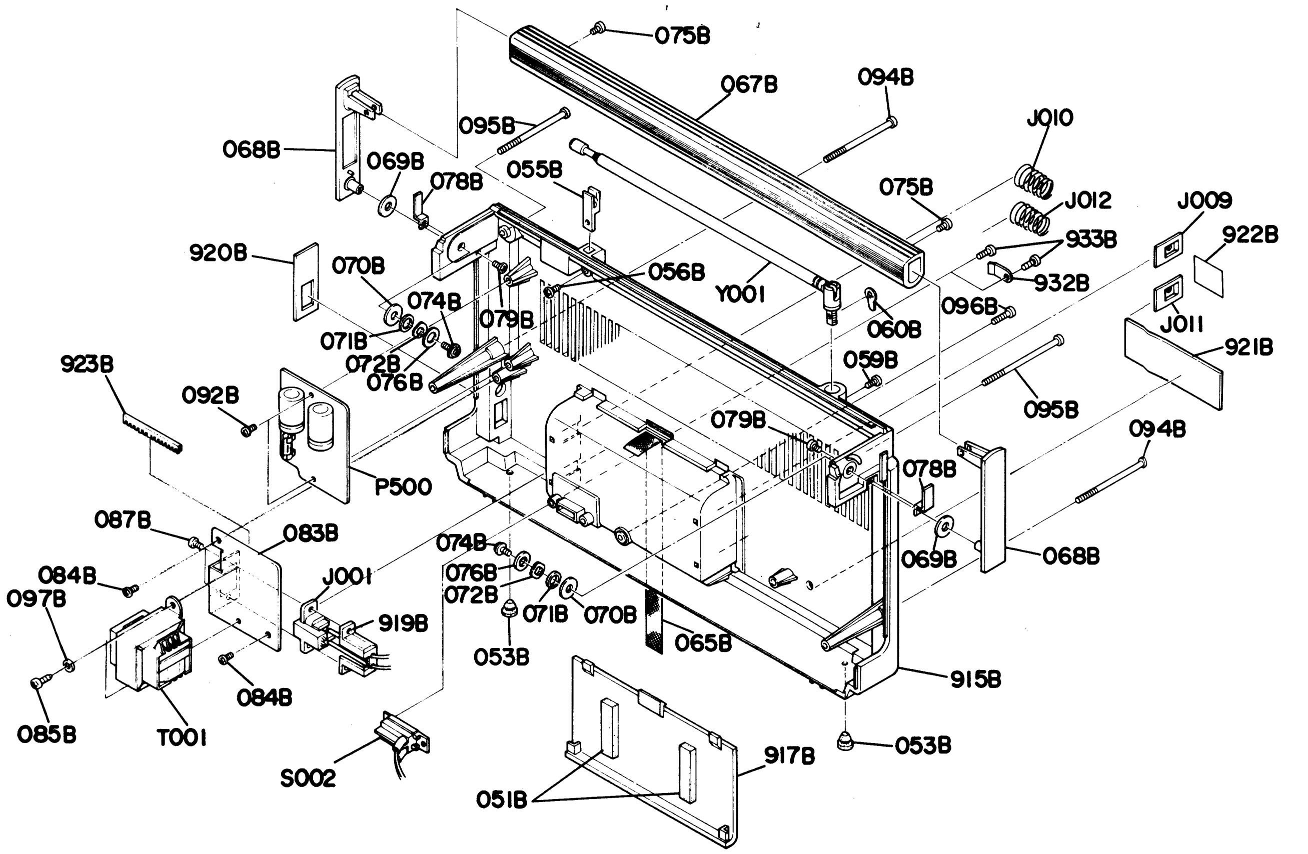
- [C01-99] Front Case


010B
001B
036B
J005
008B
N001
007B
P251
N003
N004
001B
010B
037B
036B
045B
J003
908B
035B
N002
J006
004B
008B
007B
P351
J004
019B
003B
018B
R003
014B
017B
R001
R002
910B
002B
R004
023B
003B
J007
013B
901B
906B
023B

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
*	1	4244064400	Case Assembly (A.B.C)
A	1	4244064420	Case Assembly, Front
002B	1	3347274010	Reflector
003B	2	3412056060	Buffer
004B	2	3426056020	Buffer
007B	2	4210107010	Sheet
008B	2	3489271010	Holder
023B	2	3441057010	Leg
045B	1	3448303020	Mask
901B	1	4243064520	Case, K
906B	1	4170251020	Badge
908B	2	4243202010	Net
001B	6	51280308B0	B.H. Tapped Screw B3 x 8
010B	6	1114005010	Clamper
013B	1	4243160030	Bracket
014B	2	51280308B0	B.H. Tapped Screw B3 x 8
017B	1	4270115010	Spring
018B	1	4170115030	Spring
019B	1	51280308B0	B.H. Tapped Screw B3 x 8
035B	1	4243154010	Knob
036B	4	4243154020	Knob
037B	1	3397154300	Knob
910B	1	4170064580	Case, Cassette

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
N001	1	MS50090040	Mic, Unit
N002	1	MS50090040	Mic, Unit
N003	1	QK01001160	Speaker
N004	1	QK01001160	Speaker
J003	1	YJ01000660	Jack, EXT Mic
J004	1	YJ01000660	Jack, EXT Mic
J005	1	YJ01000660	Jack, EXT Speaker
J006	1	YJ01000660	Jack, EXT Speaker
J007	1	YJ01000960	Jack, Headphone
R001	1	RC10101120	Resistor 100Ω ±10% ½W
R002	1	RC10101120	Resistor 100Ω ±10% ½W
R003	1	RC10100120	Resistor 10Ω ±10% ½W
R004	1	RC10100120	Resistor 10Ω ±10% ½W

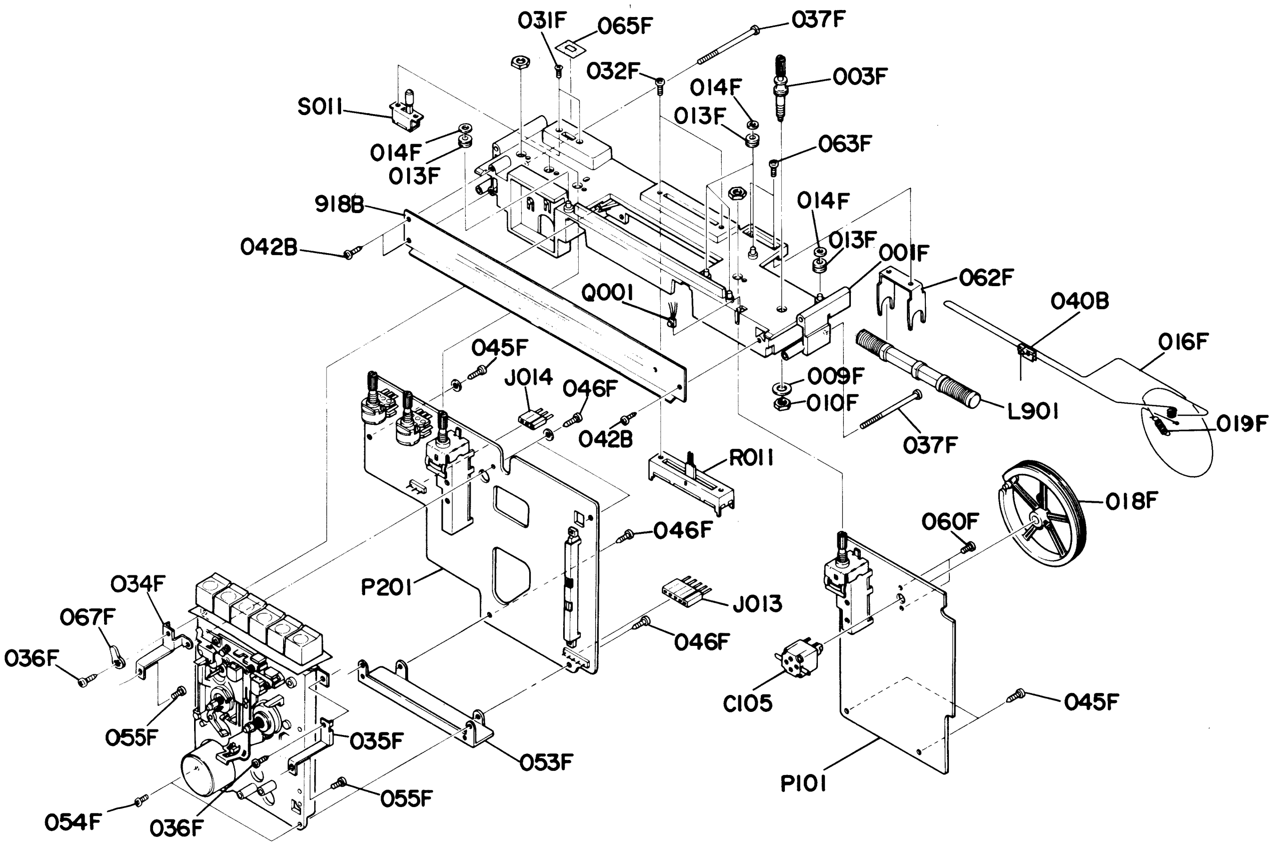
- [C02-99] Button Case


075B
067B
094B
J010
068B
069B
095B
078B
055B
075B
J012
J009
933B
922B
920B
070B
056B
932B
074B
Y001
096B
J011
071B
079B
060B
072B
076B
059B
921B
923B
092B
095B
079B
094B
P500
078B
087B
083B
074B
069B
068B
084B
J001
076B
097B
072B
071B
070B
919B
065B
053B
915B
085B
T001
084B
S002
917B
053B
051B

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
B	1	4244257400	Lid Assembly, Rear
053B	2	3441057010	Leg
065B	1	3397007010	Strip
067B	1	4243253012	Handle
068B	2	4343104012	Retainer
069B	2	59061402G9	Washer
070B	2	59061402G9	Washer
071B	2	54020601A0	Flat Washer, P.
072B	2	54130600Q0	Wave Washer
074B	2	51480306A0	F. Washer Screw F3 x 6
075B	2	51100308S9	B.H.M. Screw B3 x 8
076B	2	54012049L0	Flat Washer, S.
915B	1	4243257010	Lid
920B	1	4243265070	Indicator, Power
921B	1	4244265010	Indicator, Name
C	1	4243257430	Lid Assembly, Battery
051B	2	3411056050	Buffer
917B	1	4243257020	Lid
055B	1	4210271010	Holder
056B	1	51280308B0	B.H. Tapped Screw B3 x 8
059B	1	51140310S9	O.C.H.M. Screw 3 x 10
060B	1	62030039W0	Lug
078B	2	4243104020	Retainer

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
079B	2	51100306A9	B.H.M. Screw B3 x 6
083B	1	4243160010	Bracket
084B	2	51280310B0	B.H. Tapped Screw B3 x 10
085B	2	51480308A9	F. Washer Screw F3 x 8
087B	2	51102610A0	B.H.M. Screw B2.6 x 10
092B	2	51280308B0	B.H. Tapped Screw B3 x 8
094B	2	51284019S0	B.H. Tapped Screw
095B	2	51284029S0	B.H. Tapped Screw
096B	1	51100310S9	B.H.M. Screw B3 x 10
097B	2	54020301A0	Flat Washer, P.
919B	1	3370053010	Cover
922B	1	9510911040	Label
923B	1	2965259010	Bushing
932B	1	4240114010	Stopper
933B	2	51100312S9	B.H.M. Screw B3 x 12
J001	1	YJ04000500	Jack, AC Inlet
J009	1	YL12010150	Terminal (+)
J010	1	YL11010290	Terminal (–)
J011	1	YL12010150	Terminal (+)
J012	1	YL11010290	Terminal (–)
S002	1	SS02020510	Slide Switch
T001	1	TS14127070	Power Transformer
Y001	1	YR06080040	Whip Antenna

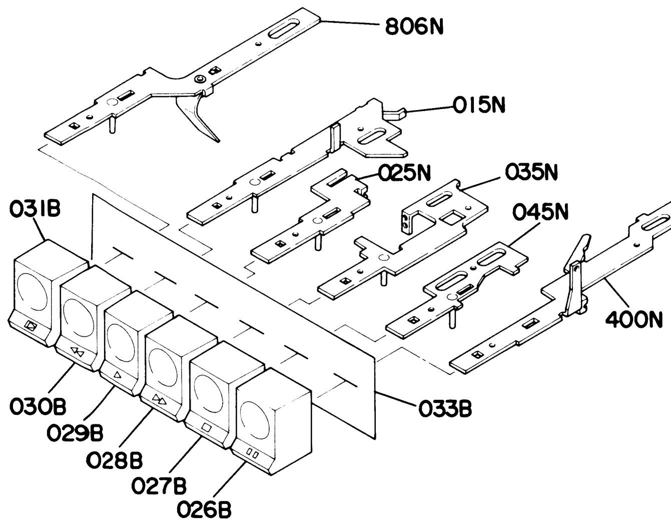
- [M01-99] P.W. Board General Parts


031F
065F
037F
032F
014F
003F
S011
013F
014F
013F
063F
918B
014F
042B
013F
001F
062F
040B
Q001
016F
045F
J014
046F
009F
010F
L901
019F
042B
037F
R011
018F
060F
046F
034F
P201
J013
067F
036F
046F
C105
045F
055F
035F
053F
P101
055F
054F
036F

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
040B	1	4243103010	Pointer
042B	3	51280308U0	B.H. Tapped Screw B3 x 8
918B	1	4243302030	Dial
001F	1	4243105010	Chassis
003F	1	4210112500	Shaft
009F	1	5401070010	Flat Washer, S
010F	1	53110713A0	Hexagon Nut
013F	5	1283262010	Pulley
014F	5	54020201A0	Flat Washer, P
016F	1	72071605A0	String (130)
018F	1	4123159010	Drum
019F	1	4123115030	Spring
031F	2	51040206S0	F.H.M. Screw F2 x 6
032F	2	51100306A0	B.H.M. Screw B3 x 6
034F	1	4243160060	Bracket
035F	1	4243160070	Bracket
036F	2	51280310B0	B.H. Tapped Screw B3 x 10
037F	2	51284039S0	B.H. Tapped Screw
045F	3	51280308B0	B.H. Tapped Screw B3 x 8
046F	4	51100306A9	B.H.M. Screw B3 x 6
053F	1	4243160020	Bracket
054F	2	51100308A9	B.H.M. Screw B3 x 8
055F	2	51100304A9	B.H.M. Screw B3 x 4

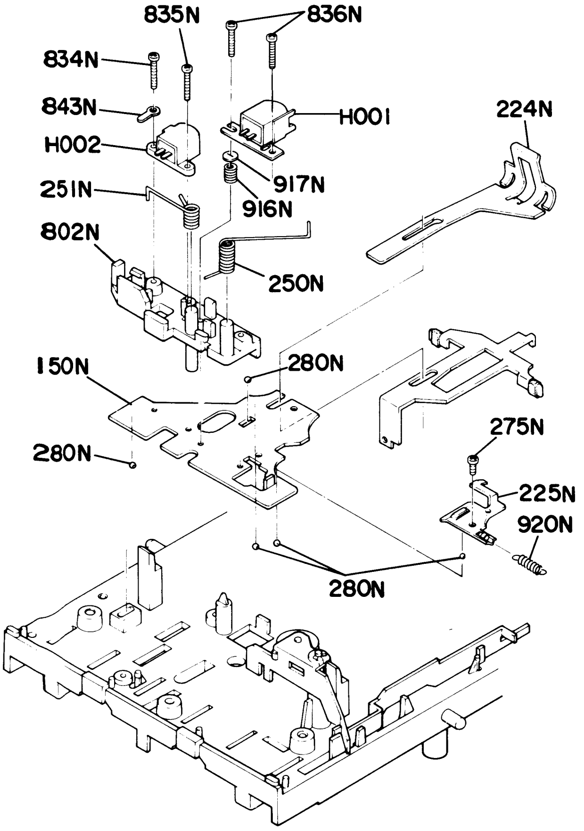
REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
060F	2	51102605A0	B.H.M. Screw B2.6x 5
062F	1	4123271010	Holder
063F	2	51100308A9	B.H.M. Screw B3 x8
065F	1	4223107020	Sheet
067F	1	62030039W0	Lug
C105	1	CP22400210	Variable Cap
J013	1	YJ06001050	Jack, (5P)
J014	1	YJ06001040	Jack, (3P)
L901	1	LF11400930	Antenna Coil MW-LW Bar Ant.
Q001	1	HI10007020	L.E.D. LN26D Stereo IND.
R011	1	RX05030160	Variable Resistor, Balance
S011	1	SS02020320	Slide Switch, Mode

- **[P01-99] Operation Levers and Buttoms**


806N
015N
025N
035N
031B
045N
400N
030B
033B
029B
028B
027B
026B

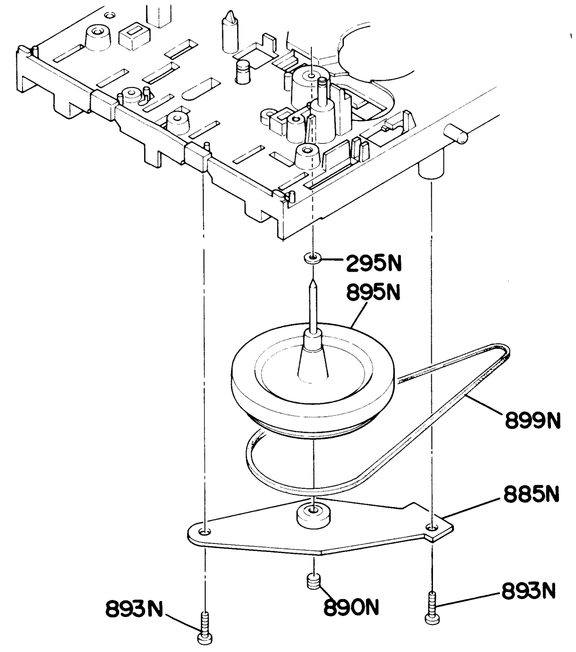
REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
026B	1	4170270070	Button, Pause
027B	1	4170270080	Button, Stop/Eject
028B	1	4170270090	Button, FF
029B	1	4170270100	Button, Play
030B	1	4170270110	Button, Rew
031B	1	4170270120	Button, Rec
033B	1	4170107010	Sheet
015N	1	4367354704	Lever
025N	1	4367354723	Lever
035N	1	4367354734	Lever
045N	1	4367354743	Lever
400N	1	4367354754	Lever
806N	1	4367354800	Lever

- **[P02-99] Head Chassis**


835N
836N
834N
843N
H001
224N
H002
917N
251N
916N
802N
250N
150N
280N
275N
280N
225N
920N
280N

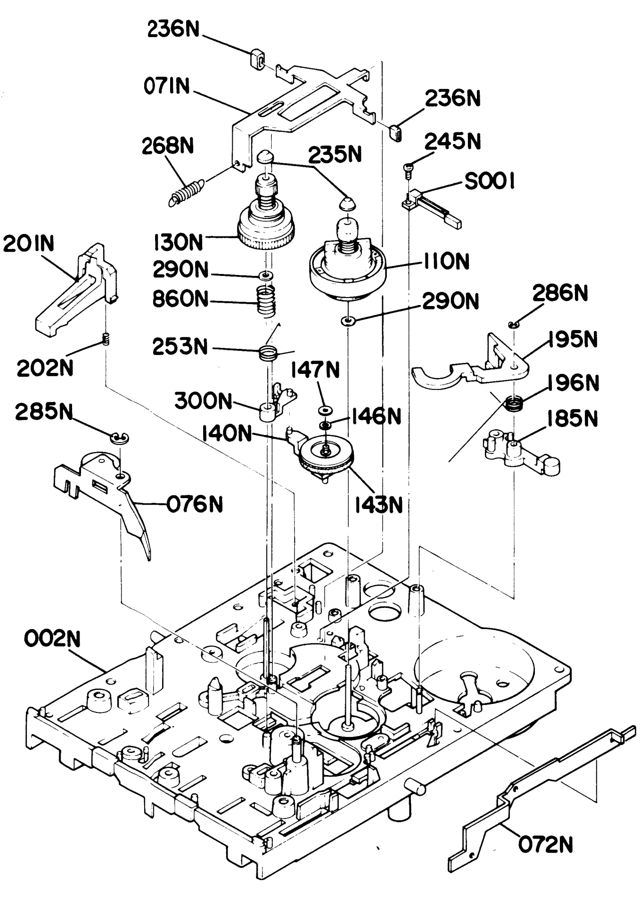
REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION	
150N	1	4367105020	Chassis	
224N	1	4367115060	Spring	
225N	1	4367115170	Spring	
250N	1	4367115040	Spring	
251N	1	4367115050	Spring	
275N	1	51300308B0	P.H. Tapped Screw	P3 x 8
280N	5	61020010T0	Ball	
802N	1	4367160010	Bracket	
834N	1	51100212A0	B.H.M. Screw	B2 x 12
835N	1	51100210A0	B.H.M. Screw	B2 x 10
836N	2	51100210A0	B.H.M. Screw	B2 x 10
843N	1	62021030W0	Lug	
916N	1	4380115090	Spring	
917N	1	3444118070	Spacer	
920N	1	4367115150	Spring	
H001	1	LH42801090	Rec/Play Head	
H002	1	LH31000470	Erase Head	

- **[P03-99] Flywheel**


295N
895N
899N
885N
893N
890N
893N

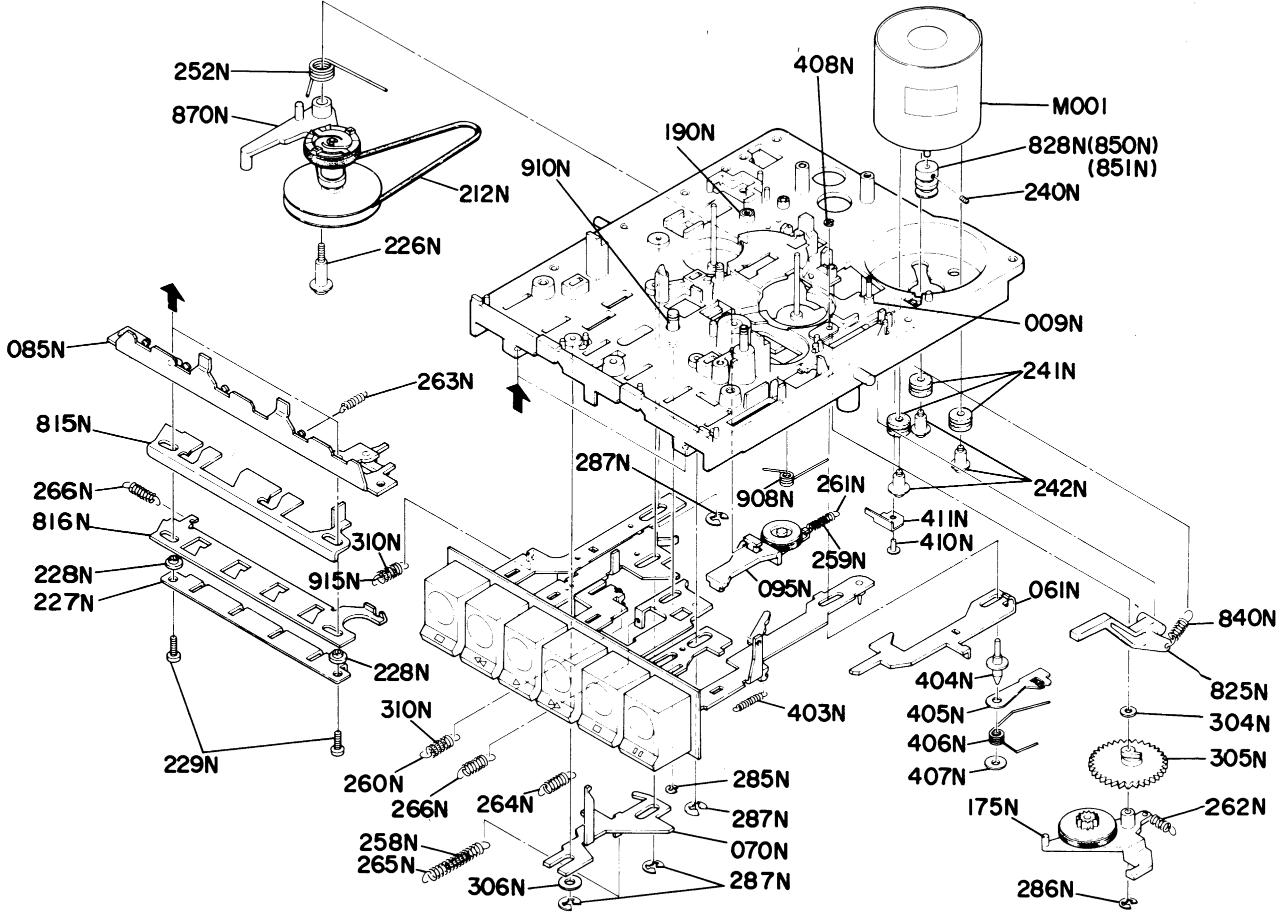
REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
	N		
295N	1	59264702G9	Washer
885N	1	4367104700	Retainer
890N	1	3483164020	Adjuster
893N	2	51300310B0	P.H. Tapped Screw P3 x 10
895N	1	4367273500	Flywheel
899N	1	4367264010	Belt

- **[P04-99] Parts Assmbled on the Top of the Chassis**


236N
071N
236N
268N
235N
245N
S001
201N
130N
110N
290N
860N
290N
286N
253N
195N
202N
147N
196N
300N
285N
146N
185N
140N
076N
143N
002N
072N

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
	N		
002N	1	4367105700	Chassis
071N	1	4367354090	Lever
072N	1	4367354120	Lever
076N	1	4367002700	Arm Pinch Roller
110N	1	4367004700	Table Tack up Real
130N	1	4367004710	Table
140N	1	4367002730	Arm
143N	1	4367001510	Idler
146N	1	95020805G9	Washer
147N	1	4367118040	Spacer
185N	1	4367354770	Lever
195N	1	4367002050	Arm
196N	1	4367115130	Spring
201N	1	4367354080	Lever
202N	1	4367115070	Spring
235N	2	4367067010	Cap
236N	2	4367263010	Brake
245N	1	51380208P0	P.H. Tapped Screw P2 x 8
253N	1	4367115310	Spring
268N	1	4367115210	Spring
285N	1	64002500R0	RG Ring, E Type
286N	1	64001500R0	RG Ring, E Type
290N	2	59020402G9	Washer
300N	1	4367354110	Lever
860N	1	4367115230	Spring
S001	1	SM01010430	Mini Switch, For Motor

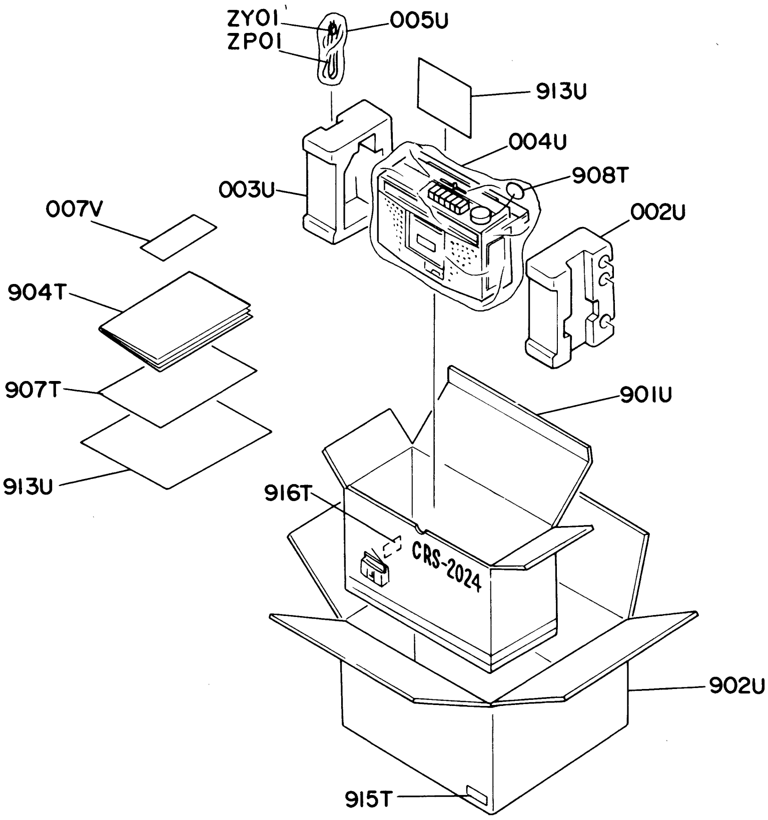
- **[P05-99] Parts Assembled on the Reverse of the Chassis**


252N
870N
212N
226N
408N
190N
910N
M001
828N(850N)
(851N)
240N
009N
085N
263N
815N
241N
287N
242N
908N
261N
266N
816N
310N
411N
410N
259N
228N
915N
227N
095N
061N
840N
228N
404N
825N
310N
403N
405N
304N
406N
305N
229N
407N
260N
285N
266N
264N
175N
262N
287N
258N
070N
265N
306N
287N
286N

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
009N	1	4367112080	Shaft
061N	1	4367354070	Lever
070N	1	4367354060	Lever
085N	1	4367051700	Guide
095N	1	4367354760	Lever
175N	1	4367002723	Arm
190N	1	4367118030	Spacer
212N	1	4367264030	Belt
226N	1	4367112180	Shaft
227N	1	4367051040	Guide
228N	2	4367055020	Collar
229N	2	51280314B0	B.H. Tapped Screw B3 x 14
240N	1	51610205A0	Set Screw, F.P. Type 2 x 5
241N	3	4367259020	Bushing
242N	3	4367112150	Shaft
252N	1	4367115080	Spring
258N	1	4367056040	Buffer
259N	1	4367056030	Buffer
260N	1	4367115240	Spring
261N	1	4367115090	Spring
262N	1	4367115120	Spring
263N	1	4367115250	Spring
264N	1	4367115340	Spring
265N	1	4367115270	Spring
266N	2	4367115280	Spring
285N	1	64002500R0	RG Ring, E Type
286N	1	64001500R0	RG Ring, E Type
287N	4	64000300R0	RG Ring, E Type

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
304N	1	4367118060	Spacer
305N	1	4367058500	Gear
306N	1	49046501G9	Washer
310N	2	4367056050	Buffer
403N	1	4367115210	Spring
404N	1	4367112130	Shaft
405N	1	4367054030	Cam
406N	1	4367115140	Spring
407N	1	59020805G9	Washer
408N	1	64001500R0	RG Ring, E Type
410N	1	4367254040	Pin
411N	1	4367160020	Bracket
815N	1	4367054040	Cam, Stop/Eject
816N	1	4367054050	Cam, Lock
825N	1	4367002110	Arm
840N	1	4367115290	Spring
850N	1	4367262040	Pulley (+2%)
828N	1	4367262020	Pulley
851N	1	4367262050	Pulley (–2%)
870N	1	4367001700	Idler
908N	1	4380115080	Spring
910N	1	4367112060	Shaft
915N	1	4367115280	Spring
M001	1	MM10600530	D.C. Motor

- **[H01-99] Packing Materials**


ZY01
ZP01
005U
913U
004U
908T
003U
002U
007V
904T
907T
901U
913U
916T
CRS-2024
902U
915T

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
002U	1	4243809010	Cushion
003U	1	4243809020	Cushion
004U	1	9011535400	Polyethy Bag
005U	1	9011020010	Polyethy Bag
901U	1	4244801010	Packing Case
902U	1	4244805010	Master Carton
913U	1	9011825010	Polyethy Bag

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
904T	1	4244851310	Instructions
907T	1	3906854020	Guarantee Card
908T	1	9560000090	Hang Tag
915T	2	9510911040	Label
916T	2	9526019010	Serial No Card
007V	1	4136071010	Cleaner
ZP01	2	YP01000280	Plug
ZY01	1	ZC01805010	A.C. Power Cord

14. ELECTRICAL PARTS LIST

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
			P101-TUNER CIRCUIT BOARD
P101	1	YG42440010	P.W. Board, Tuner
	1	ZZ42440010	P.W. Board Assembly
			P101-CAPACITORS
C101	1	DK16102300	Ceramic 0.001µF ±10%
C102	1	DK18403320	Ceramic 0.04µF
C104	1	DD15150300	Ceramic 15pF ±5%
C105	1	CP22400210	Variable AM330pF x 2
C106	1	DK18103320	Ceramic 0.01µF
C107	1	DD10050370	Ceramic 5pF ±0.25pF
C108	1	DD15180370	Ceramic 18pF ±5%
C109	1	DD15471370	Ceramic 470pF ±5%
C110	1	DK18403320	Ceramic 0.04µF
C111	1	DK18223320	Ceramic 0.022µF
C112	1	DD15510300	Ceramic 51pF ±5%
C113	1	DK18103320	Ceramic 0.01µF
C114	1	DK18223320	Ceramic 0.022µF
C115	1	DK18223320	Ceramic 0.022µF
C116	1	DD15150300	Ceramic 15pF ±5%
C117	1	DD15390300	Ceramic 39pF ±5%
C118	1	DD11100300	Ceramic 10pF ±0.5pF
C119	1	DD10050300	Ceramic 5pF ±0.25pF
C120	1	EA22700690	Elect 220µF 6V
C121	1	DD10030300	Ceramic 3pF ±0.25pF
C122	1	DK18223320	Ceramic 0.022µF
C123	1	DK18103320	Ceramic 0.01µF +100% –0
C124	1	DK18403320	Ceramic 0.04µF
C125	1	DD15150300	Ceramic 15pF ±5%
C126	1	DK18403320	Ceramic 0.04µF
C127	1	DK18403320	Ceramic 0.04µF
C128	1	DF16223300	Film 0.022µF ±10%
C129	1	DD15301360	Ceramic 300pF ±5%
C130	1	EA47503590	Elect 4.7µF 35V
C131	1	DK16102300	Ceramic 0.001µF ±10%
C132	1	DD15221370	Ceramic 220pF ±5%
C133	1	DD15221370	Ceramic 220pF ±5%
C134	1	EA47503590	Elect 4.7µF 35V
C136	1	EA47503590	Elect 4.7µF 35V
C138	1	DK18223320	Ceramic 0.022µF
C141	1	DK18223320	Ceramic 0.022µF
C142	1	EA10601690	Elect 10µF 16V
C143	1	DF16223300	Film 0.022µF ±10%
C144	1	DF16103300	Film 0.01µF ±10%
C145	1	DK18223320	Ceramic 0.022µF
C146	1	DK18223320	Ceramic 0.022µF
C147	1	DF16333300	Film 0.033µF ±10%
C148	1	DF16103300	Film 0.01µF ±10%
C149	1	EA47503590	Elect 4.7µF 35V
C150	1	DK18403320	Ceramic 0.04µF
C151	1	EA47700690	Elect 470µF 6V
C152	1	DF16393300	Film 0.039µF ±10%
C153	1	DF16473300	Film 0.047µF ±10%
C154	1	EA10505090	Elect 1µF 50V
C155	1	EE33405040	Elect 0.33µF 50V
C156	1	EA10505090	Elect 1µF 50V
C157	1	EA10701090	Elect 100µF 10V
C158	1	DF16393300	Film 0.039µF ±10%
C159	1	DF55471010	Film 470pF ±5%
C160	1	EA22502590	Elect 2.2µF 25V
C161	1	DF16472300	Film 0.0047µF ±10%
C162	1	DF16472300	Film 0.0047µF ±10%
C163	1	EA47503590	Elect 4.7µF 35V
C164	1	EA47503590	Elect 4.7µF 35V
C165	1	DF16332300	Film 0.0033µF ±10%
C166	1	DF16332300	Film 0.0033µF ±10%
C167	1	DF16682300	Film 0.0068µF ±10%
C168	1	DF16682300	Film 0.0068µF ±10%
C169	1	DF16333300	Film 0.033µF ±10%
C170	1	DF16333300	Film 0.033µF ±10%
C171	1	EA47700690	Elect 470µF 6V
C172	1	DF16393300	Film 0.039µF ±10%
C177	1	DF16683300	Film 0.068µF ±10%
C178	1	DK18103320	Ceramic 0.01µF +100% –0
C179	1	DK18103320	Ceramic 0.01µF +100% –0
C901	1	DK16102300	Ceramic 0.001µF ±10%
C902	1	DD15180370	Ceramic 18pF ±5%
C903	1	DD10050370	Ceramic 5pF ±0.25pF
C905	1	CT10800040	Trimming 8pF
C906	1	DF16103300	Film 0.01µF ±10%
C907	1	DK17103300	Ceramic 0.01µF ±20%
C908	1	DK17103300	Ceramic 0.01µF ±20%
C909	1	DK18223320	Ceramic 0.02µF
C910	1	DK18223320	Ceramic 0.02µF
C911	1	DF16222300	Film 0.0022µF ±10%
C912	1	DK17103300	Ceramic 0.01µF ±20%
C913	1	DK18103300	Ceramic 0.01µF
C914	1	DK18103300	Ceramic 0.01µF
C915	1	CT10800040	Trimming 8pF
C916	1	CT10800040	Trimming 8pF
C917	1	CT10800040	Trimming 8pF
C918	1	DD15560360	Ceramic 56pF ±5%
C919	1	DD15150370	Ceramic 15pF ±5%
C920	1	DF16223300	Film 0.022µF ±10%
C921	1	DF55151510	Film 150pF ±5%
C922	1	DF16103300	Film 0.01µF ±10%
C923	1	DF65351010	Film 350pF ±5%
C924	1	DF16472300	Film 0.0047µF ±10%
C925	1	DF55472040	Film 0.0047µF ±5%
C926	1	DK16222300	Ceramic0.0022µF ±10%
C927	1	DD10050300	Ceramic 5pF ±0.25pF
			P101-RESISTORS **(All Resistors are ±5% and ¼W)**
R101	1	GD05103140	10KΩ
R103	1	GD05102140	1KΩ
R104	1	GD05330140	33Ω
R105	1	GD05330140	33Ω
R107	1	GD05682140	6.8Ω
R108	1	GD05153140	15KΩ
R109	1	GD05102140	1KΩ
R110	1	GD05101140	100Ω
R111	1	GD05101140	100Ω

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
	N		
R112	1	GD05101140	100Ω
R113	1	GD05564140	560KΩ
R114	1	GD05222140	2.2KΩ
R115	1	GD05223140	22KΩ
R116	1	GD05822140	8.2KΩ
R117	1	GD05102140	1KΩ
R118	1	GD05221140	220Ω
R119	1	GD05152140	1.5KΩ
R120	1	GD05153140	15KΩ
R121	1	GD05103140	10KΩ
R122	1	GD05334140	330KΩ
R123	1	GD05101140	100Ω
R124	1	GD05391140	390Ω
R125	1	GD05102140	1KΩ
R126	1	GD05102140	1KΩ
R127	1	GD05102140	1KΩ
R128	1	GD05103140	10KΩ
R129	1	GD05103140	10KΩ
R135	1	GD05472140	4.7KΩ
R136	1	RA05030090	Trimming 50KΩ
R137	1	GD05103140	10KΩ
R138	1	GD05681140	680Ω
R139	1	GD05331140	330Ω
R140	1	GD05102140	1KΩ
R141	1	GD05331140	330Ω
R142	1	GD05152140	1.5KΩ
R143	1	GA05100010	10Ω 1W
R144	1	RA01020110	Trimming 1KΩ
R145	1	RA01030260	Trimming 10KΩ
R146	1	GD05183140	18KΩ
R147	1	GD05102140	1KΩ
R148	1	GD05104140	100KΩ
R149	1	GD05104140	100KΩ
R150	1	GD05104140	100KΩ
R151	1	GD05561140	560Ω
R152	1	GD05472140	4.7KΩ
R153	1	GD05472140	4.7KΩ
R154	1	GD05102140	1KΩ
R155	1	GD05102140	1KΩ
R156	1	GD05101140	100Ω
R157	1	GD05100140	10Ω
R158	1	GD05562140	5.6KΩ
R159	1	GD05152140	1.5KΩ
R160	1	GD05222140	2.2KΩ
R161	1	GD05222140	2.2KΩ
R162	1	GD05332140	3.3KΩ
R165	1	GD05561140	560Ω
R166	1	GD05221140	220Ω
R167	1	GD05153140	15KΩ
R901	1	GD05822140	8.2KΩ
R902	1	GD05223140	22KΩ
R903	1	GD05222140	2.2KΩ
R904	1	GD05822140	8.2KΩ
R905	1	GD05104140	100KΩ
R906	1	GD05561140	560Ω
R907	1	GD05330140	33Ω
R908	1	GD05331140	330Ω
R909	1	GD05103140	10KΩ
R910	1	GD05472140	4.7KΩ
R911	1	GD05821140	820Ω
R912	1	GD05471140	470Ω
R913	1	GD05821140	820Ω
R914	1	GD05391140	390Ω
R915	1	GD05332140	3.3KΩ
R916	1	GD05470140	47Ω
R918	1	GD05101140	100Ω
R919	1	GD05330140	33Ω
R920	1	GD05821140	820Ω
R921	1	GD05152140	1.5KΩ
			P101-SEMICONDUCTORS
Q101	1	HT310471C0	Transistor 2SC1047 (C)
Q102	1	HT310471B0	Transistor 2SC1047 (B)
Q103	1	HT313591B0	Transistor 2SC1359 (B)
Q104	1	HT308291B0	Transistor 2SC829 (B)
Q105	1	HD20011050	Diode 1S1555
Q106	1	HC10026030	IC LA-1201
Q107	1	HC10030010	IC HA-11227
Q108	1	HD40009090	Varicap 1S-2688
Q109	1	HD30008060	Zener RD2.7EB
Q111	1	HD20011050	Diode 1S1555
Q112	1	HD10001050	Diode 1N60
Q113	1	HD10003020	Diode 20A90
Q114	1	HD10003020	Diode 20A90
Q115	1	HD30002060	Zener RD3.9EB
Q116	1	HT309451Q0	Transistor 2SC945 (Q)
Q117	1	HD20011050	Diode 1S1555
Q901	1	HT310471C0	Transistor 2SC1047 (C)
Q902	1	HT308291B0	Transistor 2SC829 (B)
Q903	1	HD10001050	Diode 1N60
Q904	1	HD10001050	Diode 1N60
			P101-MISCELLANEOUS
F101	1	FF39800010	L.C. Filter
F102	1	FF11070120	Ceramic Filter
L101	1	LA70258020	Ant. Coil (FM RF)
L102	1	LA70258020	Ant. Coil
L103	1	LC16810010	Choke Coil
L104	1	LI10158020	I.F.T. (FM)
L105	1	LI10158030	I.F.T. (FM)
L106	1	LI10218010	I.F.T. (FM)
L107	1	LI10158040	I.F.T. (FM)
L108	1	LC22260500	Choke Coil
L109	1	LC22260500	Choke Coil
L110	1	LI70243030	I.F.T.
L901	1	LF11400930	Ant. Coil, (MW-LW Bar Ant.)
L902	1	LA70033010	Ant. Coil, (SW)
L903	1	LO70033100	OSC Coil (LW)
L904	1	LO70033090	OSC Coil (MW)
L905	1	LO70033120	OSC Coil (SW)
S101	1	SR10040040	Rotary Switch, Band

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
	N		
			P201-REC/PLAY AMP. CIRCUIT BOARD
P201	1	YK42431410	P.W. Board, Rec/Play Amp.
	1	ZZ42431410	P.W. Board Assembly
			P201-CAPACITORS
C201	1	EA10601690	Elect 10μF 16V
C202	1	DF16122300	Film 0.0012μF ±10%
C203	1	DK16102300	Ceramic 0.001μF ±10%
C204	1	EA33601090	Elect 33μF 10V
C205	1	EA47601090	Elect 47μF 10V
C206	1	EA33601090	Elect 33μF 10V
C207	1	EA10505090	Elect 1μF 50V
C208	1	DF16333300	Film 0.033μF ±10%
C209	1	DF16104300	Film 0.1μF ±10%
C210	1	EA22701090	Elect 220μF 10V
C211	1	EA47503590	Elect 4.7μF 35V
C212	1	DD15511360	Ceramic 51pF ±5%
C213	1	EA10601690	Elect 10μF 16V
C214	1	DD15101350	Ceramic 100pF ±5%
C215	1	DF16152300	Film 0.0015μF ±10%
C216	1	EA10701090	Elect 100μF 10V
C217	1	EA22701090	Elect 220μF 10V
C218	1	EA22701090	Elect 220μF 10V
C219	1	DF16224300	Film 0.22μF ±10%
C220	1	EA33700690	Elect 330μF 6.3V
C221	1	EA10701090	Elect 100μF 10V
C222	1	EA10801090	Elect 1000μF 10V
C223	1	DF16224300	Film 0.22μF ±10%
C224	1	EA22700690	Elect 220μF 6.3V
C225	1	DF16332300	Film 0.0033μF ±10%
C226	1	DF65501010	Film 500pF ±5%
C227	1	DD15511360	Ceramic 510pF ±5%
C228	1	EA10505090	Elect 1μF 50V
C229	1	EA47601090	Elect 47μF 10V
C230	1	EA10701090	Elect 100μF 10V
C231	1	DD15300330	Ceramic 30pF ±5%
C301	1	EA10601690	Ceramic 10μF 16V
C302	1	DF16122300	Film 0.0012μF ±10%
C303	1	DK16102300	Ceramic 0.001μF ±10%
C304	1	EA33601090	Elect 33μF 10V
C305	1	EA47601090	Elect 47μF 10V
C306	1	EA33601090	Elect 33μF 10V
C307	1	EA10505090	Elect 1μF 50V
C308	1	DF16333300	Film 0.033μF ±10%
C309	1	DF16104300	Film 0.1μF ±10%
C310	1	EA22701090	Elect 220μF 10V
C311	1	EA47503590	Elect 4.7μF 35V
C312	1	DD15511360	Ceramic 510pF ±5%
C313	1	EA10601690	Elect 10μF 16V
C314	1	DD15101350	Ceramic 100pF ±5%
C315	1	DF16152300	Film 0.0015μF ±10%
C316	1	EA10701090	Elect 100μF 10V
C317	1	EA22701090	Elect 220μF 10V
C318	1	EA22701090	Elect 220μF 10V
C319	1	DF16224300	Film 0.22μF ±10%
C320	1	EA33700690	Elect 330μF 6.3V
C321	1	EA10701090	Elect 100μF 10V
C322	1	EA10801090	Elect 1000μF 10V
C323	1	DF16224300	Film 0.22μF ±10%
C325	1	DF16332300	Film 0.0033μF ±10%
C326	1	DF65501010	Film 500pF ±5%
C327	1	DD15511360	Ceramic 510pF ±5%
C328	1	EA10505090	Elect 1μF 50V
C329	1	EA47601090	Elect 47μF 10V
C331	1	DD15300330	Ceramic 30pF ±5%
C332	1	EA22701090	Elect 220μF 10V
C401	1	DK17103300	Ceramic 0.01μF ±20%
C402	1	DF16153300	Film 0.015μF ±10%
C403	1	DF16103300	Film 0.01μF ±10%
C404	1	EA22701090	Elect 220μF 10V
C405	1	DK17103300	Ceramic 0.01μF ±20%
C406	1	DF16222510	Film 0.0022μF ±10%
C407	1	DF65331500	Film 330pF ±5%
C411	1	EG47701010	Elect 470μF 10V
C412	1	DK17103300	Ceramic 0.01μF ±20%
			P201-RESISTORS **(All Resistors are ±5% and ¼W)**
R201	1	GD05100140	10Ω
R202	1	GD05103140	10KΩ
R203	1	GD05222140	2.2KΩ
R204	1	GD05563140	56KΩ
R205	1	GD05822140	8.2KΩ
R208	1	RA01040110	Trimming 100KΩ
R209	1	GD05332140	3.3KΩ
R210	1	GD05823140	82KΩ
R211	1	GD05562140	5.6KΩ
R212	1	RM02030050	Variable 20KΩ
R213	1	RM01030170	Variable 10KΩ
R215	1	GD05222140	2.2KΩ
R216	1	GD05683140	68KΩ
R218	1	GD05331140	330Ω
R219	1	GD05101140	100Ω
R220	1	GD05153140	15KΩ
R221	1	GA05010010	1Ω 1W
R222	1	GA05390010	39Ω 1W
R223	1	GD05151140	150Ω
R224	1	GD05222140	2.2KΩ
R225	1	RA01040110	Trimming 100KΩ
R226	1	GD05105140	1MΩ
R227	1	GD05105140	1MΩ
R301	1	GD05100140	10Ω
R302	1	GD05103140	10KΩ
R303	1	GD05222140	2.2KΩ
R304	1	GD05563140	56KΩ
R305	1	GD05822140	8.2KΩ
R308	1	GD05333140	33KΩ
R309	1	GD05332140	3.3KΩ

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
R310	1	GD05823140	82KΩ
R311	1	GD05562140	5.6KΩ
R315	1	GD05222140	2.2KΩ
R316	1	GD05683140	68KΩ
R318	1	GD05331140	330Ω
R319	1	GD05101140	100Ω
R320	1	GD05153140	15KΩ
R321	1	GA05010010	1Ω 1W
R322	1	GA05390010	39Ω 1W
R323	1	GD05151140	150Ω
R324	1	GD05222140	2.2KΩ
R325	1	RA01040110	Trimming 100KΩ
R326	1	GD05105140	1MΩ
R327	1	GD05105140	1MΩ
R332	1	GD05332140	3.3KΩ
R401	1	GD05271140	270Ω
R402	1	GD05183140	18KΩ
R403	1	GD05100140	10Ω
R405	1	GF05010120	10Ω ½W
			P201-SEMICONDUCTORS
Q201	1	HC10040050	IC TA7137P (ST)
Q202	1	HC10022030	IC LA4110
Q203	1	HD20002060	Diode 1S1212
Q204	1	HD10001050	Diode 1S1008
Q301	1	HC10040050	IC TA7137P (ST)
Q302	1	HC10022030	IC LA4110
Q303	1	HD20002060	Diode 1S1212
Q304	1	HD10001050	Diode 1S1008
Q401	1	HT309452C0	Transistor 2SC945 (P.K)
			P201-MISCELLANEOUS
J201	1	YP06001050	Plug, (5P)
J202	1	YP06001040	Plug, (3P)
J215	1	YP10001090	Plug
J251	1	YP10001090	Plug
L201	1	LC22260500	Choke Coil 22mH
L301	1	LC22260500	Choke Coil 22mH
L401	1	LC22750500	Choke Coil 2.7mH
L402	1	LC14730040	Choke Coil 47mH
S201	1	SS12020070	Slide Switch, Rec/Play
S202	1	SR06040120	Rotary Switch, Function/Monitor
T401	1	TC10190060	OSC Transformer
			P251-MIC UNIT CIRCUIT BOARD
P251	1	YK42431430	P.W. Board, Mic Unit (L)
	1	ZZ42431430	P.W. Board Assembly
C251	1	EA10505090	Elect Cap. 1μF 50V
R251	1	GD05562140	Resistor 5.6KΩ ±5% ¼W
R252	1	GD05562140	Resistor 5.6KΩ ±5% ¼W
J003	1	YJ01000660	Jack, EXT Mic
J005	1	YJ01000660	Jack, EXT Speaker

REF. DESIG.	Q'TY N	PART NO.	DESCRIPTION
			P351-MIC UNIT CIRCUIT BOARD
P351	1	YK42431430	P.W. Board, Mic Unit (R)
	1	ZZ42431430	P.W. Board Assembly
C351	1	EA10505090	Elect Cap. 1μF 50V
R351	1	GD05562140	Resistor 5.6KΩ ±5% ¼W
R352	1	GD05562140	Resistor 5.6KΩ ±5% ¼W
J004	1	YJ01000660	Jack, EXT Mic
J006	1	YJ01000660	Jack, EXT Speaker
			P500-POWER SUPPLY CIRCUIT BOARD
P500	1	YK42431420	P.W. Board, Power Supply
	1	ZZ42431420	P.W. Board Assembly
			P500-CAPACITORS
C501	1	DK18103300	Ceramic 0.01μF +80% −20%
C502	1	DK18103300	Ceramic 0.01μF +80% −20%
C503	1	EA22801020	Elect 2200μF 10V
C504	1	EA22801020	Elect 2200μF 10V
C505	1	DK18103300	Ceramic 0.01μF +80% −20%
C506	1	DK18103300	Ceramic 0.01μF +80% −20%
			P500-SEMICONDUCTORS
Q503	1	HD20006100	Diode 10DC05
Q504	1	HD20006100	Diode 10DC05
			P500-MISCELLANEOUS
F001	1	FS10100800	Fuse 1A 250V
J510	1	YJ08000200	Jack, Fuse Holder
J511	1	YJ08000200	Jack, Fuse Holder

(W01-99)	**Assembly and Wiring**
(T01-99)	**Adjustment**
(X01-00)	**Correction**

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